

## **CHAPTER 4**

# **ENVIRONMENTAL CONSEQUENCES**

### **GENERAL**

The environmental consequences presented here are general in nature because the impacts are often difficult to quantify. Also, some of the more extensive effects have been addressed in other NEPA documents, including BLM's 2003 Farmington RMP/EIS, and the 2003 Navajo Reservoir Operations PFEIS. The following text is a brief summary of the existing condition and the environmental consequences of the two alternatives analyzed. A more detailed description of the environmental consequences may be found in Table 4-1.

The use of the terms "adverse effect(s)" and "beneficial effect(s)" in this document is generic and not tied to any specific legislation, or regulation, particularly those related to cultural resources. In general, adverse effects are those that are detrimental to the health or condition of the resource being discussed. Beneficial effects are generally those that improve the health or condition of the resource being discussed, or that reduce adverse effects to a given resource.

### **EXISTING CONDITION**

The existing condition is an expression of the cumulative effects in the area from natural and human actions to date. It reflects an ever-changing environment, human attitudes and policies regarding the land and associated resources; patterns of land and associated resource ownership; and their use and management, including management policies and priorities, both public and private.

### **NO ACTION**

The "No Action" Alternative, with a few exceptions, is essentially a continuation of the more recent historic management of the reservoir area. The existing resource conditions and trends would likely continue if reservoir area lands and the associated resources continue to be managed as they currently are. However, the anticipated increased use and development of the area, even with the same level or increased regulatory requirements and increased use of mitigation measures will likely yield somewhat increased adverse impacts to various resources and/or uses. The continued use of appropriate mitigating measures will continue to reduce some of the anticipated adverse effects.

### **PROPOSED ACTION**

The proposed action attempts to balance use of the area with resource protection while recognizing VERs, environmental mandates, legislative intent, and special interests. The level to which that intent is achieved will depend on the ability of the stakeholders to recognize and understand each other's interests and concerns, the constraints on various resources or actions, and the ability of the stakeholders to work together. The more proactive, coordinated, and cooperative management of the reservoir area and its resources should, at a minimum, further reduce adverse impacts to the existing environment and individual resources. It should also, maintain, and, in some instances,

may enhance the existing environment and the current health and condition of various resources.

## **ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE**

See Table 4-1, beginning on page 4-3.

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
<b>General Reservoir Area Management</b>			
General Reservoir Area Management	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ The current mix of resources, their status and condition, and resource use adjacent to and within the reservoir area is the long-term cumulative result of natural and human events and actions in the area to date.</li> <li>▪ The differing policies and requirements of the various agencies that manage or regulate the use of the reservoir area and/or its resources can create confusion on the part of the area's stakeholders and users.</li> <li>▪ The logistics of the reservoir area and the availability of agency funds and personnel affect the level of management within the reservoir area.</li> <li>▪ The terms and conditions associated with valid existing rights may constrain management of that use or the affected area.</li> <li>▪ Natural events and human use and development of the area may yield both adverse and beneficial effects.</li> <li>▪ The application of appropriate regulatory requirements and mitigation measures (from Appendix D and elsewhere) to authorized activities help reduce the adverse effects due to human use and development of the area.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The anticipated increased development and use within and adjacent to the reservoir area would increase the potential conflict between various uses of the area (BLM 2003a). Such conflicts might include, but are not limited to: <ul style="list-style-type: none"> <li>▪ Motorized vs non-motorized recreation</li> <li>▪ Mechanized recreation vs equestrian or pedestrian recreation</li> <li>▪ Recreation vs oil/gas development</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The more proactive and coordinated management of resources and human use of the reservoir area should generally: <ul style="list-style-type: none"> <li>▪ Reduce the adverse effects, and</li> <li>▪ Increase the beneficial effects.</li> </ul> </li> <li>▪ The level of these effects will depend on: <ul style="list-style-type: none"> <li>▪ The availability of budget and personnel for plan implementation.</li> <li>▪ The level of coordination and cooperation between the various jurisdictions and stakeholders.</li> </ul> </li> </ul>
<b>Partnerships</b>			
Partnerships	<ul style="list-style-type: none"> <li>▪ USBR has overall administrative jurisdiction of the reservoir area, and has agreements with the following entities for management within the reservoir area: <ul style="list-style-type: none"> <li>▪ NMSPD- recreation and certain other resources within NM</li> <li>▪ CDPOR- recreation and certain other resources within CO</li> </ul> </li> </ul>	<p>Effects would be the same as those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ There is a potential for the State Parks to close facilities and/or portions of the reservoir area to public use.</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus:</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Overall management of the reservoir area should be improved through: <ul style="list-style-type: none"> <li>▪ The more proactive and cooperative management of the reservoir area by</li> </ul> </li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<ul style="list-style-type: none"> <li>▪ FFO- federal minerals, Mineral Leasing Act rights-of-way, and livestock grazing within NM</li> <li>▪ The rules and regulations of the above agencies are applied within their respective jurisdictions.</li> <li>▪ Current funding for the agencies' management is limited and may not change significantly in the foreseeable future.</li> </ul>		<p>USBR and its partners, and</p> <ul style="list-style-type: none"> <li>▪ The development of additional or expanded partnerships in coordination with the existing partners.</li> </ul>
<b>Water Resources</b>			
Water Quality	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ Within the reservoir area, surface water quality is generally good; ground water quality is variable, dependent on the aquifer formation and its properties.</li> <li>▪ Various federal and state regulatory agencies manage and/or protect water quality within their respective jurisdictions through permits and associated requirements.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Reductions in surface water quality may be caused by:               <ul style="list-style-type: none"> <li>▪ Sedimentation from both disturbed and undisturbed soils.</li> <li>▪ Improper, unauthorized, and/or illegal discharge or disposal of pollutants, including, human waste.</li> <li>▪ Naturally occurring chemicals</li> <li>▪ Residual chemicals from human development and operational actions</li> </ul> </li> <li>▪ Leaks from broken pipelines, particularly where they cross the reservoir can cause water quality degradation.</li> <li>▪ Motor leaks and unburned fuel from motorboats may cause minor, localized contamination of surface waters.</li> <li>▪ Degradation of groundwater quality may be caused by:</li> </ul>	<p>Effects would be similar to those listed for the Existing Conditions, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ There would be a continued potential for slight, generally localized, decreases in water quality due to increased development and use of the area, regardless of regulatory requirements or use of mitigation measures or best management practices.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The revised reservoir operations would:               <ul style="list-style-type: none"> <li>▪ Not cause an adverse effect to the reservoir's water quality.</li> <li>▪ Effectively manage the sediment loads in the SJR below the dam.</li> </ul> </li> </ul> <p>(USBR 2003b).</p>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ There would be a slightly greater potential for maintaining, and possibly enhancing, water quality due to the expanded implementation of the various management actions and mitigation measures within the proposed plan.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>▪ Improper or ineffective casing of wells, including, oil/gas, water, injection, etc.</li> <li>▪ Dewatering coal seams as part of coal bed methane production.</li> <li>▪ Improper or ineffective disposal of waste products, including low quality produced water.</li> <li>▪ Naturally occurring chemicals</li> <li>▪ The term and degree of these potential water quality reductions is variable, depending on the situation:</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The application of appropriate regulatory requirements and mitigation measures (from Appendix D and elsewhere) to authorized activities reduces the adverse effects to water quality from human use and development within the reservoir area. Such requirements and measures may include, but are not limited to:               <ul style="list-style-type: none"> <li>▪ Acquisition of and compliance with NPDES permits.</li> <li>▪ Implementation of a water quality monitoring program,</li> <li>▪ Use of erosion control measures</li> <li>▪ Lining of oil/gas reserve or production pits,</li> <li>▪ Proper disposal of waste products.</li> <li>▪ Construction of berms around facilities</li> <li>▪ Use of automatic shut-off systems.</li> <li>▪ Siting facilities at least 500 feet from a river or the reservoir's maximum high water elevation.</li> </ul> </li> </ul>		

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
Water Management	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>Reservoir operations and inflows cause the reservoir water level to fluctuate generally between an elevation of 6085 feet (normal max. high water level) and 5990 feet (inactive pool level) (WPRS 1981), but the water level could be as low as 5,975 feet in extreme low water years (USBR 2003b).</li> <li>Fluctuating reservoir levels affect other resources and/or uses within the reservoir area. (See the specific resource or use for details.)</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Drought and future water development will reduce the current flexibility in dam releases that may be used for adaptive management. (USBR 2003b)</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>Reservoir operations help meet: <ul style="list-style-type: none"> <li>Applicable river compacts and agreements.</li> <li>Primary project purposes including storage for beneficial consumptive purposes, flood control, and power production.</li> <li>Sec. 8 recreation, fish, and wildlife purposes</li> </ul> </li> <li>There is currently some flexibility in dam releases that may be used for adaptive management. (USBR 2003b)</li> <li>High reservoir water levels improve the ability of reservoir operations to meet project purposes other than flood control.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The higher spring releases (5,000 cfs) from the revised reservoir operations may increase downstream flooding, particularly if high precipitation events occur at the same time. Releases would be adjusted as necessary during high precipitation events to attempt to avoid downstream flooding. (USBR 2003b)</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The revised reservoir operations will allow future development of SJR water for beneficial consumptive use while helping recover endangered fish (USBR 2003b).</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative.</p>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
<b>Natural and Cultural Resources</b>			
General Natural and Cultural Resources	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>Natural events and human use, development, and management of the area and its resources created the existing condition within and adjacent to the reservoir area. Such factors will continue to affect the area and its resources.</li> <li>USBR's and its partners' management of resources and uses within the reservoir affects other resources and uses. These effects may be both adverse and beneficial. (See specific resource or use headings for a more detailed discussion of effects.)</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Current resource management within the reservoir area may adversely affect various resources and/or uses within and adjacent to the reservoir area.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The application of appropriate mitigation measures (from Appendix D and elsewhere) to authorized actions has reduced the rate and intensity of adverse effects to natural and cultural resources.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition.</p>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a greater potential for protecting, and enhancing, natural and cultural resources through: <ul style="list-style-type: none"> <li>more proactive land and resource management within the reservoir area,</li> <li>increased cooperation and coordination between adjacent land and resource management agencies,</li> <li>increased use of partnerships to manage resources, and</li> <li>the expanded public education and information program.</li> </ul> </li> </ul>
Air Quality	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>The Navajo Reservoir area currently meets National Ambient Air Quality Standards.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There are intermittent, temporary and generally localized reductions in air quality due to: <ul style="list-style-type: none"> <li>Fugitive dust from oil/gas development activities; recreational use and development, and natural events.</li> <li>Vehicle and other emissions from</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>There would be somewhat increased levels of air pollutants due to the anticipated general increase in development and use of the area even with continued implementation of current regulatory requirements and use of mitigation measures and best management practices from Appendix D and elsewhere.</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a slightly greater potential for maintaining and perhaps enhancing, air quality due to the more proactive use of applicable mitigation measures and best management practices from Appendix D and elsewhere within and adjacent to the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>general traffic, oil/gas construction and traffic, and recreational use.</p> <ul style="list-style-type: none"> <li>There are also long-term and more wide-spread effects on air quality due to:               <ul style="list-style-type: none"> <li>Emissions from continuous operation of gas-fired emission sources (dehydrators, compressors, etc.) during oil and gas operations (BLM 2003a).</li> <li>Other regional emission sources such as the coal-fired power plants in the Four Corners area.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The application of appropriate regulatory requirements and mitigation measures (from Appendix D and elsewhere) to authorized activities reduces the adverse effects to air quality. Such requirements and measures may include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>Establishment of air quality monitoring programs,</li> <li>Limits on various emissions</li> <li>Dust control.</li> </ul> </li> <li>The presence of shut-in gas wells reduces the associated activity and gas fired emission sources. (BLM 2003a)</li> </ul>	<p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The revised reservoir operations are not expected to cause any adverse impacts to air quality (USBR 2003b).</li> </ul>	
Noise	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>The reservoir area has moderate to high levels of noise due to the general use and development of the area, particularly natural gas development and recreation.</li> <li>These noise levels and patterns are typical of the types of use or activity present and, with some exceptions, are generally localized and of relatively short duration.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus.</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>There may be a slight general overall increase in noise levels due to the anticipated general increase in development and use of the area, even with implementation of current noise-related requirements, mitigating measures, and best management practices.</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus:</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a greater decrease in gas compressor related noise levels within and immediately adjacent to the reservoir area due to expanded use of noise-reduction requirements for non-federal natural gas development within the reservoir area.</li> </ul>



**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Oil/gas development noise, particularly gas compression, gas flaring, and well venting are generally cited by reservoir area users as the most disturbing.</li> <li>Long-term exposure to excessive noise from all sources (work, home, recreation, traffic, etc.) damages hearing, can adversely affect health, and can adversely affect communication, learning, and work.</li> <li>Human response to noise is highly varied, based on the type and duration of noise, time of day, an individual's expectations and sensitivity to noise, and other factors.</li> </ul> <p>Common responses to loud noise include:</p> <ul style="list-style-type: none"> <li>Acceptance</li> <li>Annoyance</li> <li>Muffling (hands over ears, closing windows, etc.)</li> <li>Increasing volume of conversation or audio,</li> <li>Fear, stress, or concern.</li> <li>Avoiding or leaving the affected area.</li> </ul> <ul style="list-style-type: none"> <li>Animal response to noise is also highly varied based on each species' sensitivity, the type and duration of the noise, time of day, and other factors. Common responses include: <ul style="list-style-type: none"> <li>Fear, stress, or concern</li> <li>Avoiding or leaving the affected area.</li> <li>Acceptance.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The application of appropriate noise-related mitigation measures (from Appendix D and elsewhere) to authorized activities minimizes the adverse effects from noise. Such measures may include, but are not necessarily limited to: <ul style="list-style-type: none"> <li>Siting of facilities</li> <li>Installation of mufflers</li> </ul> </li> </ul>	<p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The re would be a general and gradual decrease in gas compressor noise levels within and immediately adjacent to the NM portion of the reservoir area as the FFO implements its noise reduction NTL for federal oil/gas development.</li> <li>The revised reservoir operations are not expected to increase noise levels due to recreational use of the reservoir or from releases to meet the Flow Recommendations criteria (USBR 2003b).</li> </ul>	

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>Enforcement of “quiet time”</li> <li>Public education and information programs.</li> <li>Closing an area to various uses or limiting various uses within an area.</li> </ul>		
Soils	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>Soil cover, within and adjacent to the reservoir area, is highly variable ranging from 0% (badlands) to 100% (pavement, and certain vegetative communities).</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>About 51% of the reservoir area (19,320 acres) has lost long-term soil productivity due to human influences, including construction of the Navajo Unit, oil and gas development, recreation development and use, and development of the area’s transportation system.</li> <li>There is continuing long-term, cumulative loss of and damage to soils within and adjacent to the reservoir area due to: <ul style="list-style-type: none"> <li>Natural causes.</li> <li>Human development and use of the area.</li> </ul> </li> <li>Adverse effects to soils include: <ul style="list-style-type: none"> <li>General erosion and potential accelerated erosion resulting from natural conditions and events, and human use and development activities.</li> <li>Shoreline erosion due to reservoir wave action; reservoir fluctuation increases reservoir shoreline erosion and sedimentation.</li> <li>Soil compaction, and disturbance of soils and soil cover with the potential for increased erosion, due to: <ul style="list-style-type: none"> <li>Oil/gas development and operation,</li> <li>Recreational development and use,</li> <li>Grazing development and use, and</li> <li>Unauthorized uses.</li> </ul> </li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>There is the potential for a general increase in soil damage and loss due to the anticipated increase in development and use of the area.</li> <li>There would be additional long- and short-term and localized disturbance of soils and loss of soil productivity due to: <ul style="list-style-type: none"> <li>New recreational facilities</li> <li>New oil/gas facilities</li> <li>Remote heavy recreational use</li> <li>Project development</li> <li>Continued development and use of a transportation system</li> <li>Natural causes</li> </ul> </li> <li>New federal oil/gas wells and roads over the next 20 years would result in about 200 acres of additional long-term disturbance of soils on USBR land in NM (BLM, 2003a).</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Implementation of the FFO RMP would increase protection of soils within the reservoir area due, in part, to the: <ul style="list-style-type: none"> <li>Increased use of NSO stipulations and COAs on federal oil/gas leases.</li> <li>Livestock management to implement the healthy rangeland initiative</li> <li>Development of ORV management plans adjacent to the reservoir area.</li> <li>Coordinated development of a</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a slightly greater potential for protecting, and possibly enhancing soils through the expanded use of BMPs and other mitigating measures, from Appendix D or elsewhere, as conditions of approval and voluntary actions.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<ul style="list-style-type: none"> <li>Localized contamination of soils due to vehicle use, oil/gas operations, and recreational use, etc..</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The application of appropriate mitigation measures (from Appendix D and elsewhere) to authorized activities minimizes the adverse effects to soils. Appropriate soil mitigation measures may include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>Reducing soil and vegetative disturbance,</li> <li>Installation and maintenance of water control structures on soil disturbances</li> <li>Prompt revegetation of soil disturbances</li> <li>Re-location of proposed facilities to avoid sensitive soils,</li> <li>Closing an area to various uses or limiting various uses within an area.</li> </ul> </li> </ul>	transportation system.	
Locatable Minerals	<ul style="list-style-type: none"> <li>There are no anticipated impacts to or from locatable minerals or their development within the reservoir area.</li> </ul>	Effects would be the same as those listed for the Existing Condition.	Effects would be the same as those listed for the Existing Condition.
Leasable Minerals-Oil/ Gas	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>Approximately 85% of the reservoir area is currently leased for gas/oil (including private, state and federal leases) and is held by production. Additional development on the existing leases may occur subject to lease terms and conditions, and applicable federal, state, and local regulations and requirements.</li> <li>The remainder of the reservoir area may be leased for oil/gas (private and SUIT) and developed subject to applicable lease terms and conditions, and federal, state, and local regulations and requirements.</li> </ul>	Effects would be same as those listed for the Existing Condition.	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a potential for greater reduction of adverse impacts from natural gas development due to proactive rehabilitation of past damage.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The reservoir area is subject to the adverse effects associated with oil/gas development, including coalbed methane.</li> <li>▪ Oil/gas development has caused slight to moderate effects to other resources (see other resource categories); such effects are partially minimized by regulatory requirements and other mitigation measures.</li> <li>▪ Application and enforcement of regulatory and other requirements for resource protection and impact mitigation creates slight to moderate, increases in the cost of oil/gas development. Such costs are generally passed on to the consumer.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The reservoir area (about 0.3 % of the San Juan Basin) remains available for oil and natural gas development, resulting in a very minimal decrease in US dependence on foreign reserves and markets.</li> </ul>		
Leasable Minerals-Coal	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ There are no anticipated effects to coal resources or from coal development. Coal development within the reservoir area is not economically feasible.</li> </ul>	Effects would be the same as those listed for the Existing Condition.	Effects would be the same as those listed for the Existing Condition.
Saleable Minerals	<ul style="list-style-type: none"> <li>▪ Portions of the reservoir area have been used for the extraction of mineral materials for construction and maintenance: <ul style="list-style-type: none"> <li>▪ of the dam and other project facilities</li> <li>▪ recreational facilities</li> <li>▪ and Archuleta County Road 500</li> </ul> </li> <li>▪ Current mineral materials use is generally met through private or BLM pits from outside of the reservoir area.</li> </ul>	Effects would be the same as those listed for the Existing Condition.	<p>Effects would be the same as those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Review of previously disturbed areas within the reservoir area and subsequent remediation, where necessary, would further reduce current adverse effects.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The reservoir area borrow sites are in various states of reclamation with associated adverse soils, vegetative and visual effects.</li> <li>▪ The active private and BLM pits are in various stages of development with associated adverse soils, vegetative and visual effects. These effects are partially minimized through regulatory requirements for mitigation of adverse effects.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The reservoir area borrow sites provided low-cost materials for the construction and maintenance; <ul style="list-style-type: none"> <li>▪ of the dam and other project facilities</li> <li>▪ recreational facilities</li> <li>▪ and Archuleta County Road 500</li> </ul> </li> <li>▪ The private and BLM pits provide necessary mineral materials for development within the general area.</li> </ul>		
Vegetation	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ The existing vegetative mosaic and composition adjacent to and within the reservoir area is the result of long-term natural and human events and processes throughout the area.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Approximately 17% of the reservoir area outside of the reservoir basin has been cleared of vegetation for various structures and facilities, including a transportation system, recreation areas, oil / gas development, and the dam.</li> <li>▪ Vegetation within the reservoir basin (about 41% of the reservoir area) is generally absent, is a low seral stage, and/or is short-lived due to fluctuation of the reservoir's water level.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ During the anticipated life of this plan, an additional 300-400 acres within the reservoir area may be cleared of vegetation for long-term development and use facilities, including oil/gas, transportation, and recreation, mostly within the sagebrush, desert shrub, and pinyon-juniper vegetation types.</li> <li>▪ Additional adverse effects to vegetation would occur within the reservoir area due to the anticipated increase in remote recreation use. The actual amount of disturbance is difficult to quantify.</li> <li>▪ Additional loss of pinyon to the pinyon ips</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ There would be selective removal of vegetation on an indeterminate number of acres within the reservoir area to meet various management objectives, including fuel hazard reduction and pest management.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The more proactive management of the reservoir area should provide additional moderate to long-term direct and indirect protection of vegetation by such actions as: <ul style="list-style-type: none"> <li>▪ Using BMPs to minimize initial disturbance and avoid riparian and</li> </ul> </li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>▪ Long term remote recreational use within the reservoir area has adversely affected vegetation at numerous locations. These adverse effects include:               <ul style="list-style-type: none"> <li>▪ Loss of or damage to individual plants and groups of plants</li> <li>▪ Changes in vegetative cover, composition, diversity, continuity and productivity</li> <li>▪ Prevention of vegetation re-establishment.</li> </ul> </li> <li>▪ Improperly managed or unauthorized livestock grazing has caused localized damage to vegetation at several locations within the reservoir area.</li> <li>▪ Livestock grazing within the reservoir area may inhibit the revegetation of disturbed areas.</li> <li>▪ Typical revegetation of disturbed areas in areas dominated by woody plants generally converts such areas to a long-term grass and herbaceous dominated community. Several hundred years may be required for such areas to return to their prior vegetative condition.</li> <li>▪ Loss of a portion of the pinyon component of the pinyon-juniper woodlands due to the current pinyon ips beetle infestation with a short-term increase in potential wildland fire hazard until the dead needles drop.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The application of appropriate mitigation measures (from Appendix D and elsewhere) to authorized activities minimizes the adverse effects to vegetative resources. Appropriate vegetation-related mitigation measures may include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>▪ Reducing vegetative and soil disturbance.</li> <li>▪ Weed control</li> <li>▪ Siting proposed facilities to avoid special vegetative communities, such as,</li> </ul> </li> </ul>	<p>beetle with the subsequent short-term increase in wildland fire hazard.</p>	<p>wetland areas, etc. on all authorized actions within the reservoir area.</p> <ul style="list-style-type: none"> <li>▪ Fencing livestock out of areas not authorized for grazing.</li> <li>▪ Closing select areas to remote recreational use.</li> <li>▪ Designation of use areas.</li> <li>▪ Closing of select roads to use by the general public.</li> <li>▪ Adverse effects to vegetation would be further reduced by implementation of mitigation measures including:               <ul style="list-style-type: none"> <li>▪ Revegetation of disturbed areas not needed for operations.</li> <li>▪ Inventory and subsequent protective actions.</li> <li>▪ Remedial revegetation of previously disturbed areas.</li> <li>▪ Implementing hazardous fuel reduction activities in select areas.</li> </ul> </li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>riparian and wetland areas, etc.</p> <ul style="list-style-type: none"> <li>Rest-rotation grazing</li> <li>Prompt revegetation of disturbed areas</li> <li>Public education and information programs,</li> <li>Closing an area to various uses or limiting various uses within an area.</li> </ul> <p>There is a slight to moderate protection of vegetation and reduction of adverse vegetative effects within the reservoir area through:</p> <ul style="list-style-type: none"> <li>Resolution of trespass grazing when discovered.</li> <li>Enforcing compliance with applicable terms and conditions for VERs.</li> </ul> <p>The long-term thinning and stand conversion effects of the pinyon ips beetle in the pinyon-juniper woodlands may allow an increase in understory vegetation that may benefit other resources such as soil and wildlife.</p>		
Riparian and Wetland Areas	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>The current condition of riparian and wetland areas adjacent to and within the reservoir area range from poor to good, depending on their location and management focus.</li> <li>Actual condition of most riparian and wetlands within the reservoir area are unknown due to lack of inventory and assessment.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>The following actions have caused long-term, direct and indirect adverse effects to the wetland and riparian areas within the reservoir area: <ul style="list-style-type: none"> <li>development and construction activities</li> <li>human use and development of the area, including, recreational use and unauthorized livestock grazing.</li> </ul> </li> <li>Such adverse effects include: <ul style="list-style-type: none"> <li>Loss of about 3,285 acres (50 miles of</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>No major losses of riparian habitat are expected under the proposed revised reservoir operations, however, such operations may: <ul style="list-style-type: none"> <li>Stress riparian and wetland vegetation along the SJR between the dam and Farmington during periods of very low flow.</li> <li>Adversely affect riparian vegetation around the reservoir due to reduced reservoir water levels.</li> <li>Cause long-term loss of vegetation vigor on the SJR between the dam and the Animas confluence.</li> </ul> </li> </ul> <p>(USBR 2003b)</p> <ul style="list-style-type: none"> <li>With the exception of the River Tracts SMA, some riparian areas could be</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Over the long-term, riparian and wetland resources within the reservoir area should generally improve due to implementation of the proposed management actions to protect and enhance those resources.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>riparian corridor) of varying quality riparian and/or wetland habit due to creation of the dam and reservoir.</p> <ul style="list-style-type: none"> <li>▪ Lack of cottonwood reproduction along the SJR below the dam due to lack of over-bank flooding due to reservoir operations for flood control.</li> <li>▪ Fluctuations in cottonwood reproduction along the reservoir perimeter due to reservoir fluctuations.</li> <li>▪ Localized trampling of banks, and over-use of and damage to riparian and/or wetland vegetation by unauthorized livestock.</li> <li>▪ Localized damage to riparian and/or wetland vegetation along the rivers due to recreational uses, such as fishing and remote vehicular access.</li> <li>▪ Localized damage to riparian and/or wetlands due to road and pipeline crossings.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The application of appropriate mitigation measures (from Appendix D and elsewhere) to authorized activities minimize the adverse effects to riparian and wetland areas. Such measures may include, but are not necessarily limited to the same measures identified in the general vegetation discussion above.</li> <li>▪ There has been some minimized of adverse effects to riparian and wetland areas within the reservoir area through: <ul style="list-style-type: none"> <li>▪ Fencing, recreational use restrictions, rehabilitation, and management of the Pine River Wetland Mitigation site (38 acres) for riparian and wetland values.</li> <li>▪ Management of the Sambrito Creek area (CO) for wetlands.</li> <li>▪ Improved BLM grazing management to benefit riparian and rangeland health.</li> <li>▪ Improved fencing in areas of repeat</li> </ul> </li> </ul>	<p>affected by oil/gas development. However, any construction along or through wetlands or water bodies would be required to meet state/federal requirements for sediment and erosion control, and protection of wetlands and water quality (BLM 2003a).</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The revised reservoir operations should: <ul style="list-style-type: none"> <li>▪ Support more natural riparian conditions along the SJR below the dam</li> <li>▪ Maintain or slightly improve cottonwood regeneration along the SJR below the dam</li> <li>▪ Increase downstream flooding, which would benefit native riparian vegetation below the dam.</li> </ul> </li> </ul> <p>(USBR 2003b).</p>	



**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	unauthorized livestock grazing.		
Sensitive Plant Species	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>Several sensitive plant species and/or their potential habitat may occur adjacent to and within the reservoir area, however, the full extent of their occurrence is not known due to limited inventories.</li> </ul> <p>General Adverse Effects</p> <ul style="list-style-type: none"> <li>Some sensitive plants and their potential habitat have likely been lost due to prior human use and development of the reservoir area, however, the full extent of any such losses is unknown.</li> <li>There is a potential for some sensitive plants or their potential habitat to be lost due to human use and development of the reservoir area, particularly oil/gas, transportation, and recreation.</li> </ul> <p>General Beneficial Effects</p> <ul style="list-style-type: none"> <li>The above potential for loss of sensitive plants and their potential habitat is minimized by USBR's and BLM's case-by-case review of proposed actions and implementation of appropriate mitigating measures from Appendix D or elsewhere. Such mitigation measures may include, but are not necessarily limited to: <ul style="list-style-type: none"> <li>Inventories of potential habitat prior to disturbance</li> <li>Avoidance of potential habitat and sensitive plant species populations,</li> <li>Fencing or other closures</li> </ul> </li> </ul> <p><i>Specific Species</i></p> <ul style="list-style-type: none"> <li>The following sensitive plant species either occur or may occur within the reservoir area within their preferred habitat; their existing situation is the same as the above described</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional General Adverse Effects</p> <ul style="list-style-type: none"> <li>The anticipated general increase in the area's use, particularly dispersed and or unauthorized uses, may increase potential damage to unknown populations of sensitive plant species and their potential habitat.</li> <li>No substantial adverse effects are anticipated to special status plant species as a result of implementing the proposed revised reservoir operations (USBR 2003b).</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The proposed proactive management, including phased inventory for T/E and sensitive plant species and their potential habitat, plus GIS and monitoring to track them and their habitat, will enhance the protection of these plants and their habitat within the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>general situation:</p> <ul style="list-style-type: none"> <li>▪ <i>Abajo penstemon</i></li> <li>▪ <i>Arboles milkvetch</i></li> <li>▪ <i>Parish's alkali grass</i></li> </ul> <p>▪ There are no anticipated effects to the following plant species or their preferred habitat from resource management and use within the reservoir area. Their preferred habitat is not present there:</p> <ul style="list-style-type: none"> <li>▪ <i>Aztec milkvetch</i></li> <li>▪ <i>Ripley milkvetch</i></li> <li>▪ <i>Santa Fe cholla</i></li> </ul> <p><i>Knowlton's cactus</i></p> <ul style="list-style-type: none"> <li>▪ Known populations of Knowlton's cactus are not adversely affected by current reservoir area management.</li> <li>▪ Unknown populations of Knowlton's cactus within the reservoir area may be adversely affected by unauthorized uses or dispersed uses such as recreation, but should not be adversely affected by actions authorized through a permit document.</li> <li>▪ The following actions within the reservoir area may affect, but are not likely to adversely affect Knowlton's cactus: <ul style="list-style-type: none"> <li>▪ BLM managed grazing within the NM portion of the reservoir area (USFWS, 1999).</li> <li>▪ Implementation of the 2003 Farmington RMP revision (USFWS 2002c).</li> </ul> </li> </ul>		
Invasive Species and Pests	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ Several species of noxious weeds are present within and adjacent to the reservoir area (See Appendix F), however, the full extent of their infestation is not known due to a general lack of weed inventories and monitoring. Noxious weeds known to be present include, but are not necessarily limited to: <ul style="list-style-type: none"> <li>▪ Russian knapweed</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Continued spread of current infestations of noxious weeds with their subsequent effects due to increased use and development of the reservoir area.</li> <li>▪ Potential for, and establishment and spread</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The development and implementation of an Integrated Pest Management Plan for the reservoir area and the proposed coordinated weed management effort should help USBR and its partners better</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>▪ Musk thistle</li> <li>▪ Tamarisk</li> <li>▪ Russian olive</li> <li>▪ Several species of common native non-plant potential pests are known to be present within and adjacent to the reservoir area (See Appendix F), however, the effect of their presence may be generally minimal and/or local. Native non-plant pests known to be present include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>▪ Common animals, such as beaver, muskrat, bats, various insects, etc.</li> </ul> </li> <li>▪ Several species of pests or invasive species are not currently known to be present within or adjacent to the reservoir area (See Appendix F). However there is potential for populations to be introduced from known population centers through various transfer methods. Such species include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>▪ Eurasian milfoil</li> <li>▪ Zebra mussels</li> <li>▪ New Zealand mud snails</li> </ul> </li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The following actions and events, both singularly and in combination, can help start and expand noxious weed or invasive species infestations within the reservoir area:               <ul style="list-style-type: none"> <li>▪ Wildland fire and fire suppression efforts</li> <li>▪ Recreational development and use</li> <li>▪ Livestock grazing,</li> <li>▪ Oil/gas development,</li> <li>▪ Transportation system development and use.</li> <li>▪ Reservoir operations</li> </ul> </li> <li>▪ The adverse effects of noxious weed infestations are variable depending on the weed, degree of infestation, and other factors, but may include:</li> </ul>	<p>of new noxious weed infestations with their subsequent effects.</p> <ul style="list-style-type: none"> <li>▪ Potential for, and possible establishment and spread of invasive non-plant pests with their subsequent effects.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Slight control of noxious weed infestations, depending on the extent and severity of the current infestation, and the level and consistency of monitoring and control efforts.</li> <li>▪ Slight decrease in rates of establishment of new infestations and in rates of spread of some current infestations due to:               <ul style="list-style-type: none"> <li>▪ Control efforts</li> <li>▪ Current use of BMPs and mitigating measures to minimize soil disturbance and to reduce seed or plant dispersal from human activities.</li> </ul> </li> <li>▪ Slight decrease in potential rates of spread or establishment of new infestations of non-native non-plant invasive species due to:               <ul style="list-style-type: none"> <li>▪ National and local public information and education programs</li> <li>▪ Voluntary use of BMPs and mitigating measures to reduce their spread from current populations to new areas.</li> </ul> </li> </ul>	<p>monitor and control current and potential noxious weed infestations within and adjacent to the reservoir area.</p> <ul style="list-style-type: none"> <li>▪ The development and implementation of an Integrated Pest Management Plan for the reservoir area and the proposed increased monitoring and public information and education should help reduce the potential for new invasive non-native non-plant infestations within the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>▪ Moderate to long-term modification of vegetative communities and subsequent modification of wildlife habitat, wildlife and livestock use.</li> <li>▪ Impairment of recreational use</li> <li>▪ Low reservoir water levels increase the potential for weed spread within the reservoir basin and downstream.</li> <li>▪ Lack of, or inadequate revegetation of disturbed areas has resulted in the establishment and spread of noxious weeds, within the reservoir area. The full extent of this effect is not known due to a lack of inventories and monitoring.</li> <li>▪ The adverse effects of non-plant invasive species and/or pests are variable depending on the species, the degree of infestation, and other factors, but may include:               <ul style="list-style-type: none"> <li>▪ Damage to water management facilities</li> <li>▪ Damage to vessels</li> <li>▪ Moderate to long-term modification of ecosystems with subsequent modification of wildlife habitat, and wildlife use.</li> <li>▪ Impairment of recreational use of the area</li> </ul> </li> </ul> <p>Beneficial effects</p> <ul style="list-style-type: none"> <li>▪ The application of appropriate mitigation measures (from Appendix D and elsewhere) to authorized activities reduce the adverse effects from noxious weeds. Such measures may include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>▪ Reducing areas of disturbance</li> <li>▪ Prompt revegetation of disturbed areas</li> <li>▪ Use of weed-free mulch</li> <li>▪ Cleaning vehicles before entering the reservoir area</li> <li>▪ Weed control</li> </ul> </li> <li>▪ There is currently a slight long-term reduction of adverse noxious weed effects</li> </ul>		

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>due to:</p> <ul style="list-style-type: none"> <li>▪ Local weed control efforts</li> <li>▪ Public education and information programs</li> </ul> <p>▪ The use of various best management practices should reduce the potential adverse effects from non-plant invasive species and pests. Such measures may include, but are not necessarily limited to:</p> <ul style="list-style-type: none"> <li>▪ Maintaining good housekeeping</li> <li>▪ Prompt control of species causing unacceptable damage</li> <li>▪ Cleaning/sanitizing recreational equipment after each use</li> <li>▪ Cleaning vehicles before entering the reservoir area</li> </ul> <p>▪ There is currently a slight long-term reduction of adverse effects from non-plant invasive species and pests due to:</p> <ul style="list-style-type: none"> <li>▪ National and local control efforts</li> <li>▪ Public education and information programs</li> </ul>		
Wildlife Habitat	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ The current types, distribution, and continuity of wildlife habitat were created by long-term modifications of the environment through natural and human events and processes. Such modifications included, but are not necessarily limited to: <ul style="list-style-type: none"> <li>▪ Loss of or changes in vegetative cover, including composition and distribution</li> <li>▪ Changes in topography.</li> <li>▪ Changes in hydrology.</li> </ul> </li> <li>▪ The extent and severity of these modifications depends on the type of habitat; its quality, quantity, distribution, and continuity; and the type and extent of changes. Also, such modifications may be</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Continued habitat fragmentation and loss would further reduce wildlife habitat quality and quantity.</li> <li>▪ Reduced reservoir water levels under the revised reservoir operations could: <ul style="list-style-type: none"> <li>▪ Cause minor impacts to riparian habitat at reservoir inflow areas.</li> <li>▪ Adversely affect the establishment of cottonwood trees around the perimeter of the reservoir.</li> </ul> </li> </ul> <p>(USBR 2003b)</p> <ul style="list-style-type: none"> <li>▪ The loss of about 200 acres of vegetation</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative , plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Over the long-term, wildlife habitat within the reservoir area should generally improve due to implementation of the proposed management actions to protect and enhance the habitat.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>considered either ad-verse or beneficial.</p> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Long-term, cumulative adverse effects to wildlife habitat from natural events and human development and use of the reservoir area include:               <ul style="list-style-type: none"> <li>▪ The general alteration, fragmentation, and/or loss of:                   <ul style="list-style-type: none"> <li>▪ Overall wildlife habitat</li> <li>▪ Crucial elk and mule deer habitat, including winter and severe winter range, and production areas.</li> <li>▪ Riparian habitat</li> <li>▪ Breeding and nesting habitat for birds associated with the pinyon-juniper woodland, sagebrush, and riparian vegetative types.</li> </ul> </li> <li>▪ The loss of about 3,325 acres of riparian and 12,325 acres of upland wildlife habitat of varying quality due to construction of the dam and the reservoir.</li> <li>▪ The degeneration of riparian habitat below the dam due to lack of over-bank flooding.</li> <li>▪ The loss of general wildlife habitat carrying capacity throughout the area.</li> <li>▪ The loss of crucial habitat carrying capacity for certain species.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The development and implementation of appropriate mitigating measures to protect and/or enhance wildlife habitat within and adjacent to the reservoir area has reduced some of the adverse effects to wildlife habitat. Such measures include, but are not necessarily limited to:               <ul style="list-style-type: none"> <li>▪ Acquisition of and/or management of uplands for big game.</li> <li>▪ Development and management of wet-</li> </ul> </li> </ul>	<p>on USBR lands due to new federal oil/gas development under the FFO 2003 RMP revision could result in the long term loss of associated wildlife habitat (BLM 2003a).</p> <ul style="list-style-type: none"> <li>▪ The loss of an additional 100-200 acres of vegetation from private, state, or Indian oil/gas development and non-oil/gas development and use within the reservoir area could cause an additional loss of associated wildlife habitat.</li> <li>▪</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The potential increase in cottonwood regeneration along the SJR below the dam under the revised reservoir operations may eventually improve riparian wildlife habitat there (USBR 2003b).</li> </ul>	

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>lands.</p> <ul style="list-style-type: none"> <li>▪ Vegetative manipulation of pinyon-juniper stands to improve big game winter habitat.</li> <li>▪ Revegetation of disturbed areas.</li> <li>▪ Inventory prior to construction or development activities,</li> <li>▪ Monitoring during construction or development activities,</li> <li>▪ Re-location of proposed facilities to avoid crucial wildlife habitats</li> <li>▪ Public education and information programs,</li> <li>▪ Closing an area to various uses or limiting various uses within an area.</li> </ul> <ul style="list-style-type: none"> <li>▪ Creation of the reservoir created additional habitat for various species such as bald eagles, and lake-related fish.</li> <li>▪ The loss of pinyon due to the pinyon ips beetle reduces overstory crown closure, increases the percent of juniper, and creates new snags which may improve habitat for various species.</li> <li>▪ The vegetative changes in the wildlife habitat may also provide beneficial effects, such as the following, for various species:               <ul style="list-style-type: none"> <li>▪ Improved forage and/or foraging habitat</li> <li>▪ Improved breeding and/or nesting habitat</li> <li>▪ Increased carrying capacity for certain species.</li> </ul> </li> </ul>		
Wildlife	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ There is ongoing short- to long-term, direct and indirect effects on wildlife within the reservoir area due to:               <ul style="list-style-type: none"> <li>▪ Natural events, including, drought, and insect epidemics,</li> <li>▪ Reservoir construction and operation</li> <li>▪ Development and construction activities, including oil/gas and recreation.</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Even with the implementation of mitigating measures, there would likely be a slight to moderate increase in the adverse effects to wildlife due to the anticipated general increased use and development of the</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional General Effects</p> <ul style="list-style-type: none"> <li>▪ The more proactive and coordinated management of the reservoir area with adjoining land owners for wildlife habitat and wildlife protection should generally reduce adverse effects and increase</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<ul style="list-style-type: none"> <li>Human (including oil/gas and recreation) and livestock use of the area</li> </ul> <p>These effects may be either adverse and/or beneficial depending on the species affected.</p> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Current short- and/or long-term adverse effects on wildlife include:             <ul style="list-style-type: none"> <li>displacement of wildlife from crucial habitat due to human presence and noise.</li> <li>changes in wildlife abundance, diversity, and distribution due to habitat changes and human presence and noise</li> <li>direct or indirect mortality of individual animals.</li> </ul> </li> </ul> <p>The degree of these impacts on a particular species of wildlife is dependent on the type and quality of the habitat; species diversity; species' sensitivity; season of use; and type, location, timing, and duration of the human activity or facility.</p> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>There is a slight to moderate long-term protection of wildlife through implementation of wildlife-related mitigation measures from Appendix D and elsewhere. Such measures include, but are not necessarily limited to:             <ul style="list-style-type: none"> <li>Seasonal and area closures to development and/or use</li> <li>Establishment of buffer zones</li> <li>Habitat rehabilitation and enhancement</li> <li>Inventory prior to construction or development activities,</li> <li>Monitoring during construction or development activities,</li> <li>Re-location of proposed facilities to avoid crucial wildlife habitats</li> <li>Public education and information programs</li> </ul> </li> </ul>	<p>reservoir area.</p> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a slight to moderate increase in beneficial effects to wildlife in the vicinity of the reservoir through:             <ul style="list-style-type: none"> <li>USBR's continued case-by case review of proposed actions and implementation and enforcement of appropriate wildlife-related mitigating measures from Appendix D or elsewhere.</li> <li>FFO's implementation of the 2003 Farmington RMP.</li> </ul> </li> </ul>	<p>beneficial effects on wildlife.</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be a slight to moderate increase in long-term direct and indirect protection of wildlife due to the more proactive and cooperative management of the reservoir area, including:             <ul style="list-style-type: none"> <li>Expanded implementation of the mitigation measures from Appendix D and elsewhere.</li> <li>Closure and/or restrictions on recreation use at remote sites.</li> <li>Expanding the public education and information program.</li> <li>More cooperative resource management across administrative boundaries.</li> <li>Increased use of partnerships to meet management objectives.</li> </ul> </li> </ul>



**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
Fisheries (Aquatic Resources)	<p>Existing Condition (general)</p> <ul style="list-style-type: none"> <li>The current fisheries adjacent to and within the reservoir area are a result of the: <ul style="list-style-type: none"> <li>Planning for, construction of, and historic operation of the reservoir by USBR.</li> <li>Historic fisheries management by the CDOW and NMDGF.</li> <li>Water appropriation, diversion, and use pursuant to federal and state laws and interstate compacts.</li> </ul> </li> <li>Both CO and NM have advisories regarding consumption of fish from Navajo Reservoir due to mercury concentrations.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There has been a long-term loss of natural riverine fisheries resources and aquatic habitat on the SJR and some its tributaries due to: <ul style="list-style-type: none"> <li>Reservoir construction and operation</li> <li>Diversion of water for beneficial consumptive use pursuant to state laws.</li> </ul> </li> <li>Repeated stress and injury to fish from catch and release fishing may be the largest source of trout mortality within the SJR "Quality Waters" (USBR 2003b).</li> <li>Excessive reservoir fluctuations during spring spawning of certain reservoir fishes, such as crappie, black bass, etc., can adversely affect their reproduction.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The proposed revision of reservoir operations is expected to cause: <ul style="list-style-type: none"> <li>A long-term 30% to 37% reduction in trout habitat within the SJR "Quality Waters" with a subsequent; <ul style="list-style-type: none"> <li>&gt;20% decline in fish populations over several years due to habitat loss and increased fishing pressure (USBR 2003b).</li> </ul> </li> <li>increased need for management strategies to support the long-term maintenance of the SJR trout fishery (NMDGF 2004).</li> <li>Additional deterioration of water quality and loss of physical habitat in the SJR trout waters between Archuleta and the Animas River (USBR 2003b).</li> <li>An adverse effect on non-native, non-salmonid fish populations between the Animas River and Lake Powell due to physical habitat changes inhibiting their reproduction (USBR 2003b).</li> </ul> </li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Proposed NMDGF actions within the SJR</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>There would be moderate to long-term direct and indirect protection of fisheries resources and aquatic habitat due to: <ul style="list-style-type: none"> <li>Establishment and enforcement of fisherman carrying capacities, if implemented, particularly on the NM quality trout waters.</li> <li>Water quality protection and improvement</li> <li>Riparian area protection and improvement</li> <li>Fisheries habitat improvement</li> </ul> </li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>Low flow releases from the dam reduce the physical habitat within the SJR below the dam and increase potential trout catches and subsequent mortality.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>A 15, 000 acre reservoir sport fishery for both warm and coldwater species was created by the dam and actions of the CDOW, the NMDGF, and the US.</li> <li>An excellent trout fishery was created below the dam as a result of reservoir releases and actions of the NMDGF and the US.</li> </ul>	<p>“Quality Waters” would:</p> <ul style="list-style-type: none"> <li>Increase physical habitat independent of river flow.</li> <li>Reduce angling pressure there.</li> </ul> <p>(NMDGF 2004)</p> <ul style="list-style-type: none"> <li>Implementation of the 2003 FFO RMP is not expected to have an impact on fisheries or other aquatic resources (BLM, 2003a).</li> <li>The proposed revision of reservoir operations is expected to cause:             <ul style="list-style-type: none"> <li>A beneficial effect on native fish populations in the SJR between the Animas River and Lake Powell due to a more natural hydrograph and associated habitat.</li> <li>A generally beneficial effect to the reservoir’s warm-water fish reproduction due to generally higher and more stable spring water levels, though rapid draw downs during this period would cause minor impacts to reservoir aquatic resources.</li> <li>A scouring of the river bed and improved fisheries habitat below the dam as a result of 5,000 cfs high flows.</li> </ul> </li> </ul> <p>(USBR 2003b).</p>	
Sensitive Wildlife Species	<p>Existing Conditions</p> <ul style="list-style-type: none"> <li>Several sensitive wildlife species occur or may occur adjacent to or within the reservoir area (See Chapter 3).</li> <li>There is no designated critical habitat for federally listed or proposed threatened or endangered wildlife species within the reservoir area.</li> </ul> <p>General Adverse Effects</p> <ul style="list-style-type: none"> <li>There is potential and sometimes actual short- to long-term direct and indirect loss of and damage to sensitive wildlife species and</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional General Adverse Effects</p> <ul style="list-style-type: none"> <li>There is increased potential for adverse effects to special status species due to the anticipated general increase in use and development of the area, event with increased use of measures to mitigate such effects.</li> <li>No substantial adverse effects are anticipated to special status wildlife species as a result of implementing the proposed</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional General Effects</p> <ul style="list-style-type: none"> <li>There would generally be less adverse effects and greater beneficial effects to sensitive wildlife species through implementation of the proposed RMP.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>their habitat in the general area around the reservoir due to human use and development.</p> <p>General Beneficial Effects</p> <ul style="list-style-type: none"> <li>There is moderate, long-term, direct and indirect protection of sensitive wildlife species and their habitat due to Federal case-by-case: <ul style="list-style-type: none"> <li>Reviews of proposed actions and resolution of unauthorized use,</li> <li>Action and species specific inventories, and</li> <li>Implementation of protective actions</li> <li>Habitat protection and enhancement.</li> </ul> </li> </ul> <p>No Adverse Effect</p> <ul style="list-style-type: none"> <li>There is no apparent adverse effect to the following sensitive wildlife species as a result of current use and development within the reservoir area: <ul style="list-style-type: none"> <li><i>American and arctic peregrine falcons</i></li> <li><i>Baird's sparrow</i></li> <li><i>Blackneck garter snake</i></li> <li><i>Black tern</i></li> <li><i>Ferruginous hawk</i></li> <li><i>Interior least tern</i></li> <li><i>Mexican spotted owl</i></li> <li><i>Mountain plover</i></li> <li><i>New Mexican meadow jumping mouse</i></li> <li><i>New Mexico silverspot butterfly</i></li> <li><i>River otter</i></li> <li><i>San Juan checkerspot butterfly</i></li> <li><i>San Juan tiger beetle</i></li> <li><i>White-faced ibis</i></li> </ul> </li> </ul> <p><i>Bald eagle</i></p> <ul style="list-style-type: none"> <li>Current management by USBR and the FFO provides protection for bald eagles and their winter habitat within and adjacent to the reservoir area.</li> </ul>	<p>revised reservoir operations (USBR 2003b).</p> <p>Additional General Beneficial Effects</p> <ul style="list-style-type: none"> <li>There is moderate, long-term, direct and indirect protection of sensitive wildlife species and their habitat</li> <li>Federal oil/gas development under the 2003 FFO RMP, may affect, but would not adversely affect listed and proposed species or their designated critical habitat (BLM, 2003a).</li> </ul> <p><i>Bald eagle</i></p> <ul style="list-style-type: none"> <li>The current protection of bald eagles and their winter habitat within the reservoir area would continue under the No Action Alternative.</li> </ul>	<p><i>Bald eagle</i></p> <ul style="list-style-type: none"> <li>Implementation of the proposed RMP would continue the protection of bald eagles and increase the protection of crucial wintering habitat within the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p><i>Gray vireo</i></p> <ul style="list-style-type: none"> <li>Development within pinyon-juniper wood-may have adversely affected local gray vireo populations.</li> <li>The loss of pinyon due to the pinyon ips beetle and subsequent increases in the percent of juniper may improve habitat for the gray vireo.</li> </ul> <p><i>Loggerhead shrike</i></p> <ul style="list-style-type: none"> <li>Development within the reservoir area in open riparian areas, grasslands, and semi-desert shrublands may have adversely affected local shrike populations.</li> </ul> <p><i>Southern plateau lizard</i></p> <ul style="list-style-type: none"> <li>Development within the reservoir area in rocky areas in a variety of vegetation types may have adversely affected local plateau lizard populations.</li> </ul> <p><i>SW willow flycatcher</i></p> <ul style="list-style-type: none"> <li>The dam and reservoir created up to a 35 mile long gap in potential SWWF habitat on the SJR and two of its tributaries.</li> <li>Potential SWWF habitat along the SJR below the dam is currently degraded due, in part, to: <ul style="list-style-type: none"> <li>changes in the river's flood pattern because of the Navajo Unit's construction and operation, and</li> <li>use and development of SJR water and riparian areas.</li> </ul> </li> <li>Riparian areas in the upper river arms of the reservoir have been degraded due, in part, to unauthorized grazing.</li> <li>Current potential SWWF habitat within and adjacent to the reservoir area is protected through BLM and USBR case-by-case review of proposed actions, inventories, and implementation of mitigation measures for</li> </ul>	<p><i>Gray vireo</i></p> <ul style="list-style-type: none"> <li>The anticipated continued development within the reservoir area's pinyon-juniper woodlands may increase the adverse effects to local populations of the gray vireo.</li> </ul> <p><i>Loggerhead shrike</i></p> <ul style="list-style-type: none"> <li>The anticipated development within the reservoir area in grassland and semi-desert shrub-lands may increase the potential adverse effects to local shrike populations.</li> </ul> <p><i>Southern plateau lizard</i></p> <ul style="list-style-type: none"> <li>The anticipated development within the reservoir area in rocky areas of various vegetative types may increase the potential adverse effects to local plateau lizard populations.</li> </ul> <p><i>SW willow flycatcher</i></p> <p>Similar to the Existing Condition, plus:</p> <ul style="list-style-type: none"> <li>The proposed revision of reservoir operations is expected to: <ul style="list-style-type: none"> <li>Cause a loss of riparian habitat on the SJR or the reservoir</li> <li>Improve riparian habitat downstream of the dam (USBR 2003b)</li> </ul> </li> <li>FFO implementation of their 2003 Farmington RMP within the reservoir area may affect, but is not likely to adversely affect the SWWF or its potential habitat (FWS 2002c).</li> <li>USBR management of the Pine River Wetland Mitigation Site in accordance with its general plan will, in the long-term, improve riparian habitat on about 38 acres.</li> </ul>	<p><i>Gray vireo</i></p> <ul style="list-style-type: none"> <li>Same effects as identified for the No Action Alternative.</li> </ul> <p><i>Loggerhead shrike</i></p> <ul style="list-style-type: none"> <li>Same effects as identified for the No Action Alternative.</li> </ul> <p><i>Southern plateau lizard</i></p> <ul style="list-style-type: none"> <li>Same effects as identified for the No Action Alternative.</li> </ul> <p><i>SW willow flycatcher</i></p> <p>Similar to the No Action Alternative, plus:</p> <ul style="list-style-type: none"> <li>The proposed increased protection and enhancement of potential SWWF habitat within the reservoir area would improve the habitat and increase the potential for SWWF nesting to occur.</li> <li>Implementation of the proposed action, may affect, but is not likely to adversely affect the SWWF.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>authorized actions.</p> <ul style="list-style-type: none"> <li>FFO implementation of their Southwestern Willow Flycatcher Habitat Management Plan would ensure no net loss of potential SWWF habitat on FFO lands (BLM, 2003a).</li> </ul> <p><i>Western burrowing owl</i></p> <ul style="list-style-type: none"> <li>It is unknown whether development within the reservoir area in this species' preferred habitat has adversely affected any local populations of the burrowing owl.</li> </ul> <p><i>Yellow-billed cuckoo</i></p> <ul style="list-style-type: none"> <li>Potential cuckoo habitat along the SJR below the dam is currently degraded due, in part, to: <ul style="list-style-type: none"> <li>changes in the river's flood pattern because of the Navajo Unit's construction and operation, and</li> <li>use and development of SJR water and riparian areas.</li> </ul> </li> <li>The current actions to protect and enhance riparian areas should benefit the yellow-billed cuckoo and its habitat in the long-term.</li> </ul> <p><i>Razorback sucker and Colorado pikeminnow</i></p> <ul style="list-style-type: none"> <li>The changes in the SJR flow regimes due to Navajo Dam and its operation, plus historic water depletions have reduced the range and the potential habitat of these species in the SJR.</li> <li>Recovery efforts throughout the Colorado River Basin, including the SJR, are offsetting some of the prior habitat and range losses for these species.</li> </ul>	<p><i>Western burrowing owl</i></p> <ul style="list-style-type: none"> <li>Continuation of the current use and management of the reservoir area should not adversely affect the western burrowing owl.</li> <li>The proposed revised reservoir operations should not affect the western burrowing owl or its suitable habitat.</li> </ul> <p><i>Yellow-billed cuckoo</i></p> <p>Similar to the Existing Condition, plus:</p> <ul style="list-style-type: none"> <li>Continuation of the current use and management of the reservoir area should not adversely affect the yellow-billed cuckoo or its habitat.</li> <li>The current beneficial effects to the cuckoo and its habitat would continue.</li> <li>The proposed revised reservoir operations are not anticipated to adversely affect the yellow-billed cuckoo, and may help improve its habitat below the dam.</li> </ul> <p><i>Razorback sucker and Colorado pikeminnow</i></p> <ul style="list-style-type: none"> <li>The revised reservoir operations would aid in the recovery of these species in the SJR by: <ul style="list-style-type: none"> <li>Creating a more natural hydrograph below the dam.</li> <li>Helping to meet the flow recommendations criteria for these endangered fish.</li> <li>Restoring critical habitat, including spawning and rearing habitat, below the dam.</li> <li>Effectively managing the tributary</li> </ul> </li> </ul>	<p><i>Western Burrowing Owl</i></p> <ul style="list-style-type: none"> <li>Implementation of the proposed RMP for the reservoir area is not expected to adversely affect the western burrowing owl.</li> </ul> <p><i>Yellow-billed cuckoo</i></p> <ul style="list-style-type: none"> <li>The more proactive and cooperative management of riparian resources within and adjacent to the reservoir area should help improve those areas to the benefit of the cuckoo.</li> </ul> <p><i>Razorback sucker and Colorado pikeminnow-</i></p> <ul style="list-style-type: none"> <li>Same effects as listed for the No Action Alternative.</li> </ul>

Table 4.1 Environmental Consequences by Alternative

Resource	Existing Conditions	No Action	Proposed Action
	<p><i>Roundtail chub</i></p> <ul style="list-style-type: none"> <li>Apparently the reservoir destroyed much of the chub's reproductive habitat and the chub is now a rare resident within the reservoir area (USBR 2003b).</li> </ul> <p><i>Sensitive Bat Species</i></p> <ul style="list-style-type: none"> <li>The current condition of populations of the sensitive bat species and their crucial habitat within the reservoir area is unknown.</li> <li>Human development and use within the reservoir area has caused a general loss or degradation of available bat habitat through fragmentation, and possible loss of roost habitats.</li> <li>The creation of the reservoir destroyed the following amounts of general bat habitat: <ul style="list-style-type: none"> <li>About 50 miles of potential habitat for those bat species associated with riparian zones</li> <li>About 12,325 acres of habitat for those bat species associated with uplands.</li> </ul> </li> <li>The creation of new snags due to the pinyon ips beetle infestation may improve roost habitat for certain sensitive bat species.</li> </ul>	<p>sediment loads into the SJR below the dam. (USBR 2003b).</p> <ul style="list-style-type: none"> <li>The following actions within the reservoir area may affect, but are not likely to adversely affect the razorback sucker and the Colorado pikeminnow or their critical habitat: <ul style="list-style-type: none"> <li>BLM managed grazing (within NM). (USFWS, 1999).</li> <li>Implementation of the 2003 Farmington RMP. (USFWS 2002c).</li> </ul> </li> </ul> <p><i>Roundtail chub</i></p> <ul style="list-style-type: none"> <li>The more natural hydrograph due to the revised reservoir operations should benefit the roundtail chub in the SJR below the Animas River (USBR 2003b).</li> </ul> <p><i>Sensitive Bat Species-</i></p> <ul style="list-style-type: none"> <li>Continued human development and use within the reservoir area will likely cause continued fragmentation of upland bat habitat and possible loss of upland bat roost habitats within the reservoir area.</li> <li>USBR's current policy of limiting development within riparian areas should help protect riparian bat habitat.</li> </ul>	<p><i>Roundtail chub</i></p> <ul style="list-style-type: none"> <li>Same effects as listed for the No Action Alternative.</li> </ul> <p><i>Sensitive Bat Species-</i></p> <ul style="list-style-type: none"> <li>Similar effects as those listed under the No Action Alternative are expected, plus, <ul style="list-style-type: none"> <li>The more proactive management of the reservoir area and implementation of measures to reduce surface disturbance should help reduce adverse effects to the remaining habitat for these sensitive bat species within the reservoir area.</li> </ul> </li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
Cultural Resources	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ The area of potential effect for both action alternatives of the Navajo RMP is the Navajo Reservoir Area. However, the reservoir's inactive storage area and the banks of the San Juan River below the dam) are not included in the area of potential effect for reservoir operations (USBR 2003b).</li> <li>▪ Past natural and human-related events and activities created the current presence, diversity, and condition of the cultural resources within the reservoir area. This is a cumulative effect that reflects a progression of time, events and activities, including: <ul style="list-style-type: none"> <li>▪ Natural conditions and events-geophysical conditions and events; floods; wind/water erosion; bioturbation; wildfire; and wildlife activities, etc.</li> <li>▪ Land/resource development and use-cultural traditions; human settlement patterns and activities; agriculture; transportation and transmission systems; livestock grazing; mineral development; and resource management activities; etc.</li> <li>▪ Recreation development and use-developed areas and associated facilities; dispersed and remote recreational activities; etc.</li> <li>▪ Illegal and/or unauthorized human activities- vandalism, looting, artifact collection unauthorized construction or use, etc.</li> </ul> </li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ An unknown number of cultural resources within the reservoir area are being or may be impacted as a result of current resource management. Potential and actual impacts to cultural resources include disturbance,</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, however, the following additional effects are expected:</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The anticipated increase in human-related activity, particularly recreation and oil/gas, within and adjacent to the reservoir area will result in additional and similar impacts to cultural resources compared to that now occurring.</li> <li>▪ Revised reservoir operations would expose increased numbers of cultural sites within the drawdown zone to impacts from natural causes and dispersed recreational activities, thereby offsetting their slight reductions in wave action impacts. (USBR 2003b)</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Continued case-by-case management of cultural resources with application of mitigation measures would continue to reduce the overall level of impacts to cultural resources within the reservoir area.</li> <li>▪ Revised reservoir operations will not likely impact riverbank cultural resources along the San Juan River downstream of the dam (USBR 2003b).</li> <li>▪ The 250/5000 and 500/5000 Reservoir Operations Alternatives would have slightly reduced (12% and 5% respectively) wave action impacts to cultural resources than the Reservoir Operations No Action Alternative. (USBR 2003b).</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, however, the following additional effects are expected:</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The more proactive management of cultural resources (including the development and implementation of the CRMP), and human use and development of the reservoir area should further reduce the level of potential and actual impacts to cultural resources within the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>damage, and/or destruction, and the associated loss of integrity, cultural affiliation, and/or scientific values whether due to natural causes or human related use and development.</p> <ul style="list-style-type: none"> <li>▪ Fluctuating water levels with the associated wave action and exposure to other impact factors (particularly wind and water erosion and dispersed recreational activities) cause a high degree of impact to the cultural resources within the reservoir drawdown zone.</li> <li>▪ Impacts to cultural resources within the reservoir area due to natural causes, dispersed recreation and general visitor use, or illegal activities generally occur without prior assessment of potential impacts or application of mitigation. These impacts generally continue until discovered and mitigation measures are applied.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Geologic events, such as sedimentation, rock falls, or landslides may have covered some cultural resources, thus providing some protection from subsequent natural and human-related impacts.</li> <li>▪ The current case-by-case management of cultural resources at Navajo Reservoir has reduced the overall level of impacts to cultural resources within the reservoir area from what may have occurred without such management.</li> <li>▪ The cumulative adverse effects to cultural resources within the reservoir area from all causes are offset through the current case-by-case application of mitigation measures, though some mitigation has not been implemented prior to disturbance. These mitigation measures include, but are not limited, to those listed in Chapter 2 and elsewhere.</li> </ul>		



**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<ul style="list-style-type: none"> <li>Current releases from the dam will not likely impact riverbank cultural resources along the San Juan River downstream of the dam.</li> </ul>		
Indian Trust Assets	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There are no known adverse effects to Indian Trust Assets due to current management of the reservoir area and its resources.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The reservoir and its current operations provide water to the Jicarilla Apache and Navajo Nations pursuant to federal legislation.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus:</p> <p>General effects</p> <ul style="list-style-type: none"> <li>No additional adverse effects to ITAs are expected under the No Action Alternative.</li> <li>Any unanticipated impacts to ITAs under the No Action alternative would be mitigated.</li> </ul>	Effects would be the same as those listed for the No Action Alternative.
Paleontological Resources	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There are no known adverse effects to high value paleontological resources within the reservoir area as a result of past and current management of the reservoir area and its resources.</li> </ul>	Effects would be similar to those listed for the Existing Condition.	Effects would be the same as those listed for No Action Alternative.
<b>Recreation/Visual Resources</b>			
General Recreation Management	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There is a short- to long-term loss of and/or damage to general recreation opportunities and/or recreational experiences within the reservoir area due to:               <ul style="list-style-type: none"> <li>Reservoir operations</li> <li>Non-recreation development activities, such as natural gas.</li> <li>Closing of areas to recreational use for administrative purposes or for resource protection.</li> <li>Lack of money and personnel for management of the reservoir area.</li> </ul> </li> <li>Natural gas development (particularly in NM) has helped create remote reservoir access points through direct means (water</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The anticipated general increase in development and use within and adjacent to the reservoir area would likely increase the adverse effects to recreational use of and/or the recreational experience within the reservoir area.</li> <li>The proposed revision of reservoir operations would have a minor adverse impact on reservoir recreation and a more significant impact on river recreation below the dam, particularly the trout fishery (USBR 2003b).</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The more proactive closure of vehicular access to remote portions of the reservoir area and the subsequent enforcement would:               <ul style="list-style-type: none"> <li>Further reduce recreational opportunities in these areas.</li> <li>Increase the administrative cost for recreation management within the reservoir area.</li> </ul> </li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The more proactive closure of vehicular</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>truck access points) and indirect means (cross country travel from nearby roads or facilities). These remote access points are difficult to manage and may be closed on a case-by- case basis.</p> <ul style="list-style-type: none"> <li>Reservoir operations and drought conditions have recently resulted in low reservoir water levels of about 6,000 feet during part of the recreation season.</li> <li>Remote, heavy recreational use has caused localized resource damage in the form of informal vehicle roads and trails, trash, fire rings, and damage to soils and vegetation at numerous locations within the reservoir area.</li> <li>Remote vehicular reservoir area access and its associated recreational uses, particularly in NM, increases administrative costs without generating corresponding revenues from entrance or use fees.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The reservoir area and its management for public recreation by CDPOR and NMSPD provide numerous flat-water, stream, and upland recreational opportunities within the reservoir area.</li> <li>The general loss of and/or damage to general recreational opportunities within the reservoir area is reduced through: <ul style="list-style-type: none"> <li>Implementation of mitigation measures for non-recreational development</li> <li>Adaptive management actions <ul style="list-style-type: none"> <li>as part of reservoir operations, and</li> <li>by NMSPD and CDPOR.</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The revised reservoir operations would cause an additional 10-foot average drop in reservoir water levels during the main recreational season, with a potential drop of up to 30 feet during droughts (USBR 2003b).</li> <li>If scenic and acoustic quality of the reservoir area declines due to oil/gas development, visitor satisfaction and visitation levels at developed recreation sites would also likely decline (BLM 2003a).</li> <li>The reduction in current vehicular access to various portions of the reservoir area would reduce recreational opportunities for individuals seeking a less regulated experience.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Implementation of the FFO Noise Reduction NTL would, over time, reduce the adverse effects to recreation within the reservoir area from the current general compressor noise levels (BLM 2003a).</li> <li>FFO's implementation of NSO on future federal oil/gas leases within the reservoir area and on oil/gas development within 500 feet of the reservoir's maximum highwater line and within 500 feet of the SJR would reduce adverse impacts to recreational use of the reservoir area.</li> </ul>	<p>access to remote portions of the reservoir area and the subsequent enforcement, should, in the long-term, reduce administrative costs for such use.</p>
Recreation- Fishing	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Increased fishing pressure on the SJR "Quality Waters" is starting to have adverse effects on the quality of the angling experience there, with increased numbers of anglers, decreased availability of good fishing sites, and a decrease in the size of</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>River flows of less than 500 cfs due to revised reservoir operations are expected to cause the following adverse effects</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The establishment of carrying capacities for fishermen on the SJR below the dam would reduce recreational fishing</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>available trout.</p> <ul style="list-style-type: none"> <li>Reservoir drawdown reduces the area available for fishing due to reduced reservoir surface area and more difficult shoreline access. The more extreme the drawdown, the greater the effect (USBR 2003b).</li> <li>Enforcement of the ORV/OHV closure and closure of current vehicular access portions of the reservoir area reduces opportunities for reservoir shoreline fishing.</li> <li>Increased catch rates due to lower water levels may require increased fisheries management actions by the respective State game and fish departments to maintain sport fish populations within the reservoir area, thereby increasing agency costs.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>In response to reduced flows, anglers in the SJR “Quality Waters” are starting to self-regulate their use in order to have a more quality experience (NMSPD 11/16/04).</li> <li>Lower reservoir water levels generally result in an increase in the overall fish catch rate on the reservoir (USBR 2003b) which may make for a more enjoyable experience.</li> <li>Adaptive management opportunities within the current reservoir operations could potentially be used to reduce adverse effects to fisheries on the SJR below the dam and on the reservoir.</li> </ul>	<p>within the SJR “Trout Waters”:</p> <ul style="list-style-type: none"> <li>Reduce dory float fishing trips by up to 50%, however, rafts may replace dories.</li> <li>Increase numbers of wading anglers due to increased ease of wading. Wade fishing may replace some of the current float fishing.</li> <li>Increase conflicts between anglers due to increased crowding because of less fish-able area. This is particularly likely if the total number of anglers stays the same or increases.</li> <li>Decrease the angling experience due to increased angler crowding and fewer fish.</li> <li>Possibly reduce angler use due to the less desirable angling experience, with a potential annual loss of 2,800 – 4,800 out-of-state-angler days.</li> <li>Possibly increase total angler use due to increased accessibility.</li> </ul> <p>(USBR 2003b)</p> <ul style="list-style-type: none"> <li>Continued case-by-case closures of remote areas to vehicular access further reduces opportunities for reservoir shoreline fishing.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Adaptive management opportunities within the proposed reservoir operations could potentially be used to minimize adverse effects to fisheries on the SJR below the dam and on the reservoir.</li> <li>Implementation of the management activities proposed by NMDGF in the “San Juan Trout Waters Management Plan” would help maintain a quality fishing experience there.</li> </ul>	<p>opportunities there.</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The implementation of riparian and aquatic habitat enhancement activities on the SJR below the dam would help improve fishing opportunities there.</li> <li>The establishment and enforcement of carrying capacities for fishermen on the SJR below the dam would, in the long run, improve the recreational experience there.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
Recreation- ORV Use	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ The reservoir area is closed to ORV use, but unauthorized use occurs at numerous points within the reservoir area.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Unauthorized ORV use within the reservoir area has caused long-term localized damage to soil and vegetation, and increased trash and waste disposal problems at numerous points around the reservoir.</li> <li>▪ Unauthorized ORV use within the reservoir area increases the administrative costs of the respective State parks department for enforcement and cleanup activities without offsetting fees.</li> <li>▪ The ORV closure within the reservoir area has resulted in a minor loss of recreational opportunities within a regional context.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The closure of the reservoir area to ORV use provides beneficial effects to other resources by limiting the area disturbed and reducing the number of people in a given area, at a given time.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The anticipated general increase in natural gas development and recreational use adjacent to and within the reservoir area would result in: <ul style="list-style-type: none"> <li>▪ The continued use and a possible increased use of the existing remote access points with the accompanying adverse effects.</li> <li>▪ The creation of additional remote access points, with the associated recreational use and adverse effects.</li> </ul> </li> <li>▪ Continued case-by-case closure of remote reservoir areas to unauthorized vehicular access would further reduce recreational opportunities within the reservoir area.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Continued case-by-case closure of remote reservoir areas to unauthorized vehicular access would, in the long run, further reduce recreational administrative costs within the reservoir area.</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Implementation of the proposed action should. <ul style="list-style-type: none"> <li>▪ Decrease the potential for expanded damage at those areas currently incurring such use.</li> <li>▪ Decrease the potential for unauthorized ORV use and the subsequent resource damage to expand to new areas.</li> </ul> </li> </ul>
Recreation- Boating	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ At flows &lt;500 cfs lower SJR commercial rafters do not put in due to safety and navigational problems (USBR 2003b).</li> <li>▪ At flows of 500 ≤ 800 cfs, lower SJR commercial outfitters use smaller craft, reducing their capacity and efficiency and increasing costs (USBR 2003b).</li> <li>▪ Reservoir drawdown adversely affects general reservoir boating due to reduced reservoir accessibility, reduced reservoir surface area, and changes in boating hazards. The more extreme the drawdown, the greater</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ At the revised flows due to proposed reservoir operations, the current lower SJR commercial rafting industry may not remain viable due to: <ul style="list-style-type: none"> <li>▪ Increased operating costs</li> <li>▪ A reduced quality of experience,</li> <li>▪ Shorter trip duration, and</li> <li>▪ Reduced numbers of rafters.</li> </ul> </li> </ul> <p>(USBR 2003b)</p>	<p>Effects would be Similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Development and enforcement of boating carrying capacities (if deemed necessary) on the SJR below the dam and on the reservoir would reduce boating opportunities within the reservoir area and increase administrative costs for recreation management.</li> </ul> <p>Additional Beneficial Effects</p>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>the effect.</p> <ul style="list-style-type: none"> <li>Because of siltation, boaters' ability to launch from the Arboles (CO) boat ramp is reduced at a reservoir water elevation of about 6010 feet. CDPOR currently dredges sediment from the boat ramp between water elevations of about 6010 and 6000 feet. (CDPOR 11/22/04).</li> <li>A reservoir water elevation of about 6,000 feet currently renders the following boating facilities unusable:               <ul style="list-style-type: none"> <li>Mooring Cove (CO)</li> <li>Arboles (CO) boat ramp due to siltation and excessive costs for dredging (CDPOR 11/22/04).</li> <li>Sims Mesa (NM) boat ramp due to the presence of cliffs (NMSPD 11/16/04)</li> <li>Pine (NM) boat ramp, however, NMSPD has approval to extend this ramp to an elevation of 5,973 without additional NEPA documentation (NMSPD 11/16/04).</li> </ul> </li> <li>Low reservoir water levels decrease reservoir boating:               <ul style="list-style-type: none"> <li>Accessibility</li> <li>Capacity</li> <li>Safety</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>High reservoir water levels increase reservoir boating:               <ul style="list-style-type: none"> <li>Accessibility</li> <li>Capacity</li> <li>Safety</li> </ul> </li> <li>Adaptive management opportunities within the current reservoir operations could potentially be used to reduce adverse effects to boating on the SJR below the dam and on the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>River flows of less than 500 cfs due to revised reservoir operations are expected to r Reduce dory float fishing trips within the SJR "Trout Waters" by up to 50%, although, rafts may replace dories. (USBR 2003b)</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Adaptive management opportunities within the proposed reservoir operations could potentially be used to reduce adverse effects to boating on the SJR below the dam and on the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Development and enforcement of boating carrying capacities (when and if deemed necessary) on the SJR below the dam and on the reservoir could, in the long run, improve the boating and recreational experience.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
Recreation- Concessions	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The lack of a concessionaire at the Miller Mesa/Sambrito area (NM) has: <ul style="list-style-type: none"> <li>▪ Caused the area to be closed indefinitely to vehicular access.</li> <li>▪ Reduced remote, low-cost recreational opportunities.</li> </ul> </li> <li>▪ The lack of a concessionaire at the Arboles Recreation Area (CO) has: <ul style="list-style-type: none"> <li>▪ Reduced available recreational opportunities and visitor services</li> <li>▪ Increased CDPOR's management costs</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The lack of a concessionaire at the Miller Mesa/Sambrito area (NM) and the subsequent closure of the area to vehicular access has reduced NMSPD's administrative costs for management of the area and helped protect natural and cultural resources.</li> <li>▪ The concessions at the Pine River and Sims Mesa Recreation Areas provide recreation opportunities and related services to visitors.</li> <li>▪ CDPOR's concession operation has improved recreational service.</li> <li>▪ NMSPD issues permits for commercial fishing guide services on the San Juan River below the dam to provide additional recreational opportunities and help maintain the international significance of the trout fishery.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Replacement of a concessionaire at the Arboles Recreation Area (CO) would: <ul style="list-style-type: none"> <li>▪ Restore the availability recreational opportunities and visitor services previously supplied by concession. Actual opportunities and services may or may not be the same as provided previously.</li> <li>▪ Reduce CDPOR's management costs for providing limited concessions services.</li> <li>▪ Concession services provided by CDPOR could bring in additional revenue to the park through marina operations, gas sales, and dry storage.</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative.</p>
Recreation- Trails	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Trails and their use may increase the general adverse effects to other resources (soil, vegetation, wildlife habitat, wildlife, cultural resources, etc.) from human development and use.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition,</p>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Providing additional bike and/or pedestrian trails within the reservoir area would increase non-vehicular recreational</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	Beneficial Effects <ul style="list-style-type: none"> <li>▪ The existing trails within the reservoir area provide additional non-vehicular recreational opportunities there.</li> <li>▪ Some of the existing trails provide additional access to the reservoir area.</li> </ul>		opportunities and access. <ul style="list-style-type: none"> <li>▪ The adverse effects to other resources due to additional trails and their use will be minimized through their location and other design criteria, and the use of appropriate BMPs.</li> </ul>
Recreation- Public Information and Education	Beneficial Effects <ul style="list-style-type: none"> <li>▪ The current public information and education programs within the reservoir area provide visitors with information on State Park regulations, area history, and natural resources.</li> </ul>	Effects would be the same as those listed for the Existing Condition.	Effects would be similar to those listed for the No Action Alternative, plus,  Additional Beneficial Effects <ul style="list-style-type: none"> <li>▪ The expanded use of the public information and education programs to help explain the uses and management of the reservoir area and get visitors more involved in the area's management should help reduce conflicts and improve overall management of the area and its resources.</li> </ul>
Recreation- Employee Housing	Adverse Effects <ul style="list-style-type: none"> <li>▪ Employee housing within NLSP (NM) is generally old and in need of rehabilitation and/or replacement. The park's management plan calls for rehabilitation and/or a revision of employee housing opportunities at the park.</li> </ul> Beneficial Effects <ul style="list-style-type: none"> <li>▪ Reasonably priced housing opportunities for state employees, particularly seasonal employees, is provided within NSP and NLSP respectively by CDPOR and NMSPD.</li> <li>▪ Employee housing at Navajo State Park was recently rehabilitated.</li> </ul>	Effects would be similar to those listed for the Existing Condition, plus,  Additional Beneficial Effects <ul style="list-style-type: none"> <li>▪ Employee housing within NLSP will be rehabilitated, replaced or provided for in some other manner.</li> </ul>	Effects would be the same as those listed for the No Action Alternative.
Visual Resources	Existing Condition <ul style="list-style-type: none"> <li>▪ The current visual resources within and adjacent to the reservoir area are the cumulative result of natural events and</li> </ul>	Effects would be similar to those listed for the Existing Condition, plus,	Effects would be the same as those listed for the No Action Alternative, plus.

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>human actions to date.</p> <ul style="list-style-type: none"> <li>▪ The reservoir creates a strong visual contrast between the water surface and the adjoining upland.</li> <li>▪ Within the reservoir area most visual impacts due to oil/gas development and use are not readily apparent outside of the foreground due to topographic and/or vegetative screening and/or distance.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ There are short- and long-term adverse changes to visual resources within and adjacent to the reservoir area due to natural causes and human use and development.</li> <li>▪ Reservoir drawdown adversely affects the visual quality of the reservoir area by exposing the “bath tub” ring of bleached rocks and un-vegetated shoreline and mud-flats. The greater the drawdown, the greater the effect.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Implementation of visual resources BMPs and mitigation measures reduce the adverse changes to the area’s visual resources. Such practices and measures include, but are not limited to: <ul style="list-style-type: none"> <li>▪ Siting to take advantage of existing topographic or vegetative screening.</li> <li>▪ Painting facilities to blend with the environment.</li> <li>▪ Prompt re-vegetation of disturbed areas.</li> <li>▪ Reducing the area of disturbance.</li> <li>▪ Reducing the profile of structures.</li> </ul> </li> </ul>	<p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ There would likely be a nominal long-term reduction in the quality and character of the visual setting within the reservoir area due to the anticipated increase in the development and use of the area even with continued use of visual resources related BMPs and mitigating measures (USBR 1999; BLM 2003a).</li> </ul>	<p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Assigning VRM classifications to the reservoir area along with the associated management objectives would help guide the overall development and management of the area to maintain its visual character.</li> </ul>



**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
<b>Lands and Land Uses</b>			
General Lands and Land Uses	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>There are potential and actual direct and indirect loss of and damage to general lands and land uses within the reservoir area due to: <ul style="list-style-type: none"> <li>Natural causes such as erosion, wildfire, insect epidemics, drought, etc.</li> <li>Human use of the area, including development and construction and operation and maintenance activities (oil/gas, recreation, ranching/livestock grazing, agriculture, reclamation projects).</li> </ul> </li> <li>The presence of various split estates and VERs within and adjacent to the reservoir area, creates potential conflict and incompatibility between the use of the land by the landowner, the general public, and the holder of a VER.</li> <li>The temporary and localized impacts (noise, dust, emissions, etc.) from the following land uses within or adjacent to the reservoir area would have no long-term effect on any particular land use: <ul style="list-style-type: none"> <li>Oil/gas construction and development (BLM 2003a)</li> <li>Non-oil/gas (recreation, range,</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The implementation and use of BMPs and other mitigation measures on authorized actions within and adjacent to the reservoir area yield moderate- to long-term direct and indirect protection of land and land uses and reduce adverse impacts from various land uses.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The anticipated increased development and use within and adjacent to the reservoir area would increase the potential conflict between various uses of the area (BLM 2003a).</li> <li>Due to the anticipated population growth in the region, there is a potential for additional residential and commercial development on private lands adjacent to the reservoir area along with the adverse effects associated with such development. Such adverse effects may include: <ul style="list-style-type: none"> <li>Increased unauthorized use of or trespass on reservoir area lands.</li> <li>Increased visual resources impairment.</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The more proactive management and coordination of lands and land uses within the reservoir area with stakeholders and adjacent land managers should help reduce overall adverse impacts and increase beneficial impacts throughout the general area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
Project Purposes and Facilities	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Potential adverse impacts to project purposes from land uses within and adjacent to the reservoir area include: <ul style="list-style-type: none"> <li>Reductions in water quality from human development and use (municipal, industrial, residential, agricultural, recreation, transportation, etc.) within the reservoir watershed.</li> <li>Accidental or willful damage to project facilities</li> </ul> </li> <li>Adverse impacts to other resources and/or land uses from construction and/or operation of the reservoir includes: <ul style="list-style-type: none"> <li>Inundation and loss of up to 15,000 acres of former riverine, riparian, and upland areas with the associated adverse effects to resources and former uses.</li> <li>Creation of a major barrier on big game migratory routes.</li> <li>Loss of or degradation of SJR habitat for Colorado pikeminnows and razorback suckers</li> <li>Degradation of SJR riparian areas below the dam due to reduced flows with associated adverse effects to riparian vegetation, wildlife, and other values.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The construction and operation of the Navajo Unit (dam and reservoir) provides: <ul style="list-style-type: none"> <li>water storage for beneficial uses, including ITAs</li> <li>flood control</li> <li>recreational opportunities</li> <li>fish/wildlife habitat</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The revised reservoir operations would have minimal impact on USBR project operations and maintenance (USBR 2003b).</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The revised reservoir operations would allow the continued development of: <ul style="list-style-type: none"> <li>USBR projects supported by the Navajo Unit</li> <li>Other SJR basin water development</li> </ul> </li> </ul>	<p>Effects would be the same as those listed for the No Action Alternative.</p>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
Valid Existing Rights	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Some of the existing VERs may have minimal terms and conditions for environmental protection.</li> <li>The conditions and stipulations associated with the various VERs may constrain the USBR's ability to manage lands and resources within the reservoir area.</li> <li>The many VERs present within and adjacent to the reservoir may: <ul style="list-style-type: none"> <li>Conflict with one or more other VERs to varying degrees</li> <li>Cause various adverse effects to other resources and/or uses of the area.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>The many VERs present within and adjacent to the reservoir area provide: <ul style="list-style-type: none"> <li>Recreational opportunities and services,</li> <li>Vehicular and commodity transportation,</li> <li>Water for beneficial uses</li> <li>Agricultural and industrial commodities, including livestock, oil/gas, and electricity</li> </ul> </li> <li>The conditions and stipulations associated with a particular VER, when enforced, may constrain that holder's exercise of said use and provide for reducing adverse effects of such use.</li> </ul>	<p>Effects would be the same as those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>Revised reservoir operations may adversely affect some existing San Juan River water diversions below the dam. Modifications to those diversions would be necessary for them to continue operations. Impacted diverters may have to spend an additional \$16,000 per year to repair damage to diversion works due to high flows. (USBR 2003b)</li> <li>SJR flows below 373 cfs from revised reservoir operations would impact the Bloomfield waste-water treatment plant discharge and require the plant and its operation to be modified. An additional \$80 thousand would be required to meet NPDES requirements and there would be lost revenues of about \$60 thousand. (USBR 2003b).</li> <li>USBR's improved enforcement of VER terms and conditions would likely increase the cost to holders for implementation of those rights.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Revised reservoir options will: <ul style="list-style-type: none"> <li>Ensure that certain future water uses (ALP, NIIP, and JAN's water contracts) would have an adequate water supply</li> <li>Not impact existing and future water uses that have completed ESA consultation.</li> </ul> </li> </ul> <p>(USBR 2003b).</p> <ul style="list-style-type: none"> <li>USBR's clarification and enforcement of VER terms and conditions should reduce the adverse environmental effects from the exercise of those rights.</li> </ul>	<p>Effects would be the same as those listed for the No Action Alternative, plus,</p>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
		<ul style="list-style-type: none"> <li>USBR's working with and encouraging holders of VERs to take remedial and/or enhancement actions outside of the terms and conditions of their authorizing documents may help reduce the adverse effects from the exercise of those rights.</li> </ul>	
Oil/Gas Development	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>About 85 % of the reservoir area is leased for oil/gas and is held by production. This includes Federal, state, and private leases in NM and private leases in CO. Development of these leases will continue in accordance with the lease terms and applicable laws, regulations, and agreements.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Oil/gas development within the reservoir area has adversely affected and has the potential to further affect various other resources and uses.</li> <li>The elimination of the "no drilling within 1500 feet of Navajo Dam and its appurtenances" requirement may cause structural damage to project features.</li> <li>The cost of oil/gas development is increased, in part, by the environmental protection requirements placed on such development. That increased cost is generally reflected in the prices paid by the consumer.</li> <li>If too high, the cost of environmental requirements may delay or otherwise reduce oil / gas development or may cause some oil / gas operators to go out of business.</li> <li>Recreational use within the area of oil/gas development may result in damage to oil/gas equipment and facilities, theft or destruction of signs, graffiti, and littering (BLM 2003a).</li> <li>Noise, visual intrusions, dust, and traffic associated with oil/gas development and operations can be incompatible with nearby</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <ul style="list-style-type: none"> <li>Those reservoir area lands not currently leased may be leased and developed by private, state, or tribal mineral rights holders at some future time. Development of these leases would be in accordance with the lease terms and applicable laws, regulations, and agreements.</li> </ul> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The anticipated increase in oil/gas development within the reservoir area would cause increased adverse effects to various resources and uses within the reservoir area regardless of the continued use of regulatory requirements, BMPs, and mitigating measures.</li> <li>About 140 new federal wells on reservoir area lands in NM (BLM 2003a) and an additional undetermined number of private, state and/or tribal wells on the remainder of the reservoir area, with the associated roads, traffic, noise, dust, etc are expected on reservoir area lands in NM within the next 20years.</li> <li>FFO's implementation of the NSO lease stipulation for new federal leases within the reservoir area in NM and the NSO within 500 feet of the reservoir's maximum highwater line or the SJR would increase the cost of oil/gas development</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The increased application of reasonable and appropriate BMPs and mitigating measures from the FFO RMP and the SUIT Oil and Gas Development ROD, and elsewhere, on all oil/gas development within the reservoir area, to the fullest extent possible, would increase the overall cost of oil/gas production from within the reservoir area.</li> <li>Reinstatement of the requirement to not allow drilling within 1500 feet of Navajo Dam and its appurtenant features would increase the cost of oil/gas development on leases within that area.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The increased application of reasonable and appropriate BMPs and mitigating measures from the FFO RMP and the SUIT Oil and Gas Development ROD, and elsewhere, on all oil/gas development within the reservoir area, to the fullest extent possible, would increase the protection of other resources and uses within the reservoir area.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<p>residential and commercial uses. (BLM 2003a)</p> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The reservoir area, about 0.3 % of the San Juan oil/gas basin, is available for development to help reduce our dependence on foreign reserves and markets.</li> <li>▪ The adverse effects of oil/gas development are minimized through implementation of regulatory requirements, BMPs, and mitigation measures. These requirements, practices, and measures include, but are not limited to: <ul style="list-style-type: none"> <li>▪ The respective state regulatory requirements through the COGCC and NMOCD review and approval processes. (See the respective state oil / gas regulations and requirements.)</li> <li>▪ Federal lease stipulations, NTLs, and COAs for federal lease operations through FFO and USBR review and approval processes. (See Appendix N of the FFO 2003 PRMP/FEIS, and Appendix D of this document)</li> <li>▪ USBR stipulations for surface use on reservoir lands with split estate. (See Appendix D of this document).</li> </ul> </li> </ul>	<p>within the reservoir area due to the need for directional drilling.</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Implementation of the FFO Noise Reduction NTL will reduce general noise levels within the reservoir area within and immediately adjacent to NM.</li> <li>▪ FFO's implementation of the NSO lease stipulation for new federal leases within the reservoir area in NM and the NSO within 500 feet of the reservoir's maximum highwater line or the SJR would reduce adverse impacts to reservoir area resources and uses, other than oil/gas development.</li> </ul>	
Rights-of-way and Other Land Use Authorizations	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The presence of rights-of-way and other land use authorizations with their associated facilities within and adjacent to the reservoir area add to the general cumulative adverse effects of development within and adjacent to the reservoir area.</li> <li>▪ The cost of right-of-way and other land use development and maintenance is increased, in part, by the environmental protection requirements placed on these uses. That increased cost is generally reflected in the</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Long term low-flows from the revised reservoir operations will cause the following adverse effects to hydro-electric generation at the City of Farmington's plant at the dam: <ul style="list-style-type: none"> <li>▪ Extreme vibration and damage to turbine blades if the current turbines are operated for extended periods at</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <p>The more proactive and coordinated management of the reservoir area with adjoining land managers should help reduce overall adverse effects and increase overall beneficial effects.</p>

**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
	<p>prices paid by the consumer.</p> <ul style="list-style-type: none"> <li>▪ If too high, the cost of environmental requirements may delay or otherwise reduce development of rights-of-way and other land uses or may cause some operators to go out of business.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ Rights-of-way and other land uses within the reservoir area help provide local and/or regional facilities for: <ul style="list-style-type: none"> <li>▪ Generation of hydro-electric power</li> <li>▪ Local distribution of electricity</li> <li>▪ Local collection and distribution of natural gas through pipelines</li> <li>▪ A local and regional transportation system</li> </ul> </li> <li>▪ The implementation of BMPs and mitigating measures for authorized land uses reduce the adverse effects of such uses.</li> </ul>	<p>flows &lt;350 cfs; cost of turbine modification to mitigate this damage is between \$75,000 and \$100,000.</p> <ul style="list-style-type: none"> <li>▪ If the turbines are not modified, the plant may need to be shut-down during extended periods of low flow, yielding an annual loss of \$7 million.</li> <li>▪ The cost to purchase replacement power would be between about \$5.3 million and \$7 million annually. That loss could be reduced if the City modified the plant to better utilize the lower flows.</li> <li>▪ The City of Farmington may have to increase electricity rates to cover lost revenues or to replace or upgrade equipment at the power plant.</li> </ul> <p>(USBR 2003b)</p>	
Transportation	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The proliferation of oil/gas roads is seen as a problem with regard to: <ul style="list-style-type: none"> <li>▪ Environmental and visual damage (BLM 2003a)</li> <li>▪ Increasing public access through and adjacent to private land (BLM 2003a)</li> <li>▪ Increased potential for trespass on private lands. (BLM 2003a)</li> <li>▪ Increased potential for unauthorized use of the reservoir area</li> <li>▪ Increasing remote access to the reservoir area and the need for increased management of such access and associated uses.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The existing transportation system provides general and specific access to and within the reservoir area.</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ Over the next 20 years there may be about a 2% net increase of road mileage within the high oil and gas development area of the FFO, including the reservoir area, (this figure does not account for closure or restoration of roads during well abandonment) (BLM, 2003a).</li> <li>▪ The increased use of the area's transportation system, particularly by the oil/gas industry would, over the long term, increase the need for maintenance on the existing road network (BLM 2003a).</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The FFO Roads Committee/program is expected to improve some past road maintenance problems and provide a more</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ USBR's more proactive management of the reservoir area and coordination with adjoining land managers should help provide a reasonable transportation system that benefits the area's stakeholders and helps protect reservoir area resources.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
		equitable division of maintenance responsibilities and resources (BLM 2003a).	
Accessibility for Persons with Disabilities	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>The reservoir area's topography and fluctuating reservoir water levels make it difficult or cost prohibitive to provide persons with disabilities access to the reservoir for recreational purposes.</li> <li>The case-by-case closure of general vehicular access to remote portions of the reservoir reduces recreational opportunities for persons with disabilities.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>Accessibility for persons with disabilities has been provided at several facilities and locations within the reservoir area (See Appendix G). These locations include, but are not necessarily limited to: <ul style="list-style-type: none"> <li>West Piedra fishing access (CO)</li> <li>West Piedra watchable wildlife area (CO)</li> <li>Arboles Recreation Area and Visitor Center (CO)</li> <li>Sims Mesa Recreation Area and Visitor Center (NM)</li> <li>Pine River Recreation Area and Visitor Center (NM)</li> <li>SJR fishing access (NM).</li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The planned ADA fishing access at Cottonwood Campground would provide additional access to the SJR for persons with disabilities for fishing purposes.</li> </ul>	<p>Effects would be the same as those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>USBR's more proactive management of the reservoir area and coordination with its management partners should help improve accessibility to facilities, programs, and services.</li> </ul>
Livestock grazing	<p>Adverse Effects</p> <ul style="list-style-type: none"> <li>Lack of fencing, and inadequate or poorly maintained fencing result in unauthorized livestock use and the associated adverse effects at various locations within the reservoir area. These locations include, but are not limited to Miller Mesa, Sambrito Creek, and the San Juan, Piedra, and Los</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>USBR's clarification and enforcement of the terms and conditions of reserved livestock ingress/egress rights across its lands would likely increase the cost to</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The more proactive management of the 23 reserved livestock ingress/egress rights within the reservoir area would reduce the adverse impacts associated with the current</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>Pinos River inlets.</p> <ul style="list-style-type: none"> <li>Current management of the 23 reserved livestock trailing and/or watering rights within the reservoir area has increased the incidence of unauthorized grazing and the associated impacts within the reservoir area.</li> <li>Oil/gas (BLM 2003a) and recreation related disturbance within the NM portion of the reservoir area reduces forage and acreage available for livestock grazing.</li> <li>Oil/gas development may also cause the following adverse effects:               <ul style="list-style-type: none"> <li>Poisoning or other physical damage to livestock near o/g wells, particularly those not fenced. (BLM 2003a)</li> </ul> </li> <li>Noxious weeds within the reservoir area:               <ul style="list-style-type: none"> <li>compete with desired rangeland plants</li> <li>may reduce available forage</li> <li>may poison livestock.</li> </ul> </li> <li>Remote recreational use of the reservoir area may result in:               <ul style="list-style-type: none"> <li>Harassment of livestock</li> <li>Damage to fences, and other range improvements</li> <li>Damage to vegetation, including spreading of noxious weeds, loss of preferred plants, and loss of soil productivity.</li> </ul> </li> </ul> <p>(BLM 2003a)</p> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>FFO management of grazing within the NM portion of the reservoir area helps maintain and/or improve rangeland conditions and riparian values.</li> <li>Case-by-case review of unauthorized grazing and subsequent resolution of same reduces the associated adverse impacts.</li> </ul>	<p>holders for the exercise of those rights and may result in the termination of some of those rights.</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>USBR's clarification and enforcement of the terms and conditions of reserved livestock ingress/egress rights across its lands would reduce the adverse environmental effects from the exercise of those rights.</li> </ul>	<p>management.</p> <ul style="list-style-type: none"> <li>The more proactive identification and resolution of fencing problems along the reservoir area boundary will reduce the incidence of unauthorized grazing within the reservoir area and its associated adverse effects.</li> </ul>



**Table 4.1 Environmental Consequences by Alternative**

<b>Resource</b>	<b>Existing Conditions</b>	<b>No Action</b>	<b>Proposed Action</b>
Fire Management	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>There is a slight to moderate potential for wildland or structural fires within and adjacent to the reservoir area due to the human use and development of the area and the vegetative conditions present.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>The potential adverse effects of fire within and adjacent to the reservoir area, include, but are not limited to: <ul style="list-style-type: none"> <li>Loss of vegetation and vegetative soil cover</li> <li>Damage to soils and increased potential for accelerated erosion</li> <li>Temporary degradation of surface water quality.</li> <li>Temporary degradation of air quality</li> <li>Conversion of vegetative types and associated wildlife habitat.</li> <li>Increased spread of noxious weeds</li> <li>Loss of project, recreational and oil/gas facilities, and range improvements.</li> <li>Injury and/or death of animals, both wildlife and livestock,</li> <li>Injury and/or death of humans.</li> </ul> </li> <li>The degree or level of resource damage from fire depends on several factors, including, but not limited to: <ul style="list-style-type: none"> <li>The size and severity of the fire</li> <li>The vegetative community present and its composition and arrangement</li> <li>The species of wildlife present and their crucial habitats</li> <li>The time of year, weather conditions, and vegetation moisture content.</li> </ul> </li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>Minimal fire-related impacts to resources or facilities are expected due to the low historic incidence of wildland or structural fires in the</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition.</p>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>The development and implementation of a coordinated fire management plan for the reservoir area, including reduction of fuels in specific areas would: <ul style="list-style-type: none"> <li>Reduce the potential for fire-related damage and loss of resources and facilities within and adjacent to the reservoir area</li> <li>Improved public safety</li> <li>Reduce the associated cost of fire suppression and rehabilitation.</li> </ul> </li> <li>The use of prescribed fire could help maintain and/or enhance various vegetative communities and the associated wildlife habitats.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>area.</p> <ul style="list-style-type: none"> <li>Current fire suppression policies and agreements provide some basic protection for resources and facilities within the reservoir area.</li> <li>Potential fire suppression efforts within and adjacent to the reservoir area are benefited by:               <ul style="list-style-type: none"> <li>The roads and clearings from oil/gas and other development activities in the area</li> <li>A ready source of water from the reservoir and the rivers.</li> </ul> </li> <li>The beneficial effects of fire can include, but are not limited to:               <ul style="list-style-type: none"> <li>Maintaining and/or enhancing certain vegetative communities and the associated wildlife habitat.</li> <li>Reduced wildland fire potential</li> <li>Noxious weed control</li> <li>Creation of new or different wildlife habitat</li> </ul> </li> <li>The degree or level of such beneficial effects is dependent on many of the same factors identified above for the adverse effects of fire.</li> </ul>		
Socio-Economics	<p>Existing Conditions</p> <ul style="list-style-type: none"> <li>Natural gas production from the San Juan Basin and recreation/tourism are major elements of the long-term economy for the general area.</li> <li>The value of natural gas production and recreation/tourism to the local economy, while relatively high, may also be highly variable from one year to the next, due to many factors.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>A drop in the overall values from any economic factor, which may be insignificant in a regional context, could be quite</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>The revised reservoir operations could adversely affect local economies associated with recreation and tourism below the dam (USBR 2003b).</li> <li>The anticipated loss of out-of-state trout fisher-men below the dam due to revised reservoir operations could cause the following economic losses (USBR 2003b):               <ul style="list-style-type: none"> <li>in San Juan County, NM:                   <ul style="list-style-type: none"> <li>\$1.83 to \$6.16 million in total annual revenue, and</li> </ul> </li> </ul> </li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>USBR's more proactive management of the reservoir area and coordination with management partners should help improve the value of recreation/tourism to the local economy. For example, assuming a 5% annual increase in visitation and using the estimate from CDPOR that 100,000 visitors each year generates approximately \$2 million in local expenditures, results in additional annual expenditures of \$13.4 million by the year 2010.</li> </ul>

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<p>significant to local individuals or businesses.</p> <ul style="list-style-type: none"> <li>Recreational visitation at Navajo Reservoir in 2003 dropped by about 84,600 from the 2000 level. Using the CDPOR estimate of \$20 in direct annual expenditures to the local economy per park visitor (USBR 1999), that drop in visitation equaled a reduction of about \$1.69 million from the 2000 level.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>Using the 1995 CDPOR estimate of \$20 direct expenditures annually to the local economy per state park visitor (USBR 1999) and the visitor figures from Table 3-5, recreational use of the reservoir area provides about \$14 to \$17 million annually to the local economy. However, the actual value is likely higher, since actual current expenditures are probably higher than the 1995 estimate. Also, these estimated annual revenues will vary in direct proportion to the visitation levels at the reservoir area.</li> <li>Out-of-state trout fishermen on the SJR below the dam currently provide a direct annual expenditure of about \$11 to \$12.7 million to the local [SJ County, NM] economy with a total annual economic output of about \$15.6 to \$18 million (USBR 2003b).</li> <li>A very general idea of the gross income from natural gas production from the reservoir area may be obtained using the average daily San Juan Basin gas production of 4 billion cf (BLM 2003a), the percentage of the SJB within the reservoir area (0.003), and the percentage (0.85) of the reservoir area currently under lease. For example, these gross oil/gas incomes would be about: <ul style="list-style-type: none"> <li>\$7.45 million at \$2.00/mcf, and</li> <li>\$14.9 million at \$4.00/mcf</li> </ul> <p>These values would be about 0.53% and 1.06%, respectively, of the 1997 San Juan County, NM \$1.4 billion (BLM 2003a) in gas production.</p> </li> </ul>	<ul style="list-style-type: none"> <li>40-135 jobs</li> <li>to NMDGR and NMSPD</li> <li>\$22,400 to \$75,200 in annual fishing license fees</li> <li>\$11,200 to \$37,600 annually in NLSP day use fees</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>Over the long term, the revised reservoir operations would benefit water development and agricultural support industries in the local communities (USBR 2003b).</li> <li>Implementation of the proposed reservoir operations could cause the following estimated economic gains (USBR 2003b): <ul style="list-style-type: none"> <li>For San Juan County, NM <ul style="list-style-type: none"> <li>About \$44.8 million annual increase in total output (about 1.2% of county total)</li> <li>About \$11.8 million additional annual personal income (about 1% of county total)</li> <li>About 749 new jobs (about 2% increase)</li> </ul> </li> </ul> </li> <li>The anticipated increased recreational use of the reservoir would provide an additional amount of dollars annually to the local economy. However, the actual increase depends on the actual increase in visitation.</li> </ul>	

**Table 4.1 Environmental Consequences by Alternative**

Resource	Existing Conditions	No Action	Proposed Action
	<ul style="list-style-type: none"> <li>▪ The reservoir and its operation help support the agricultural component of the local economy, particularly in San Juan County, NM, and the Navajo Nation.</li> <li>▪ Livestock grazing within the reservoir area provides a very minor portion of the agricultural component of the local economy.</li> </ul>		
Environmental Justice	<p>Existing Condition</p> <ul style="list-style-type: none"> <li>▪ There is likely minimal use of the reservoir area by minorities and low-income persons, due in part to:               <ul style="list-style-type: none"> <li>▪ State Park entry and use fees, and</li> <li>▪ Availability of alternative use areas on public or tribal lands closer to their residence.</li> </ul> </li> <li>▪ Use of the reservoir area by minorities and low-income persons is likely to be day use and/or use at remote areas due to lower or no use fees.</li> <li>▪ Subsistence use of the reservoir area by minorities or low-income persons is likely limited to fishing and possibly hunting.</li> </ul> <p>Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ State Park entry and use fees may restrict use of the reservoir area by minorities and low-income persons.</li> </ul> <p>Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The current remote vehicular access provides additional opportunities for use of the reservoir area by minority and low-income</li> </ul>	<p>Effects would be similar to those listed for the Existing Condition, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The case-by-case closure of remote vehicular access to the general public would reduce opportunities for minority and low-income person use of the reservoir area more than what currently exists.</li> <li>▪ State Park entry and use fees would continue to restrict minority and low-income persons that do use the area. The impact likely would be even greater if fees are added for remote entry and use or are increased.</li> <li>▪ The greater reduction in vehicle access to re-mote areas of the reservoir would decrease the use of the reservoir area by minority and low-income persons somewhat more than the Existing Condition.</li> </ul> <p>Additional Beneficial Effects</p> <ul style="list-style-type: none"> <li>▪ The positive employment impacts associated with the revised reservoir</li> </ul>	<p>Effects would be similar to those listed for the No Action Alternative, plus,</p> <p>Additional Adverse Effects</p> <ul style="list-style-type: none"> <li>▪ The greater reduction in vehicle access to remote areas would decrease the use of the reservoir area by minority and low-income persons slightly more than the No Action Alternative.</li> </ul>

Table 4.1 Environmental Consequences by Alternative			
Resource	Existing Conditions	No Action	Proposed Action
	persons.	operations and completion of NIIP would be particularly beneficial to the Navajo Nation and the region, which currently has high unemployment.	

## CUMULATIVE EFFECTS

The current mosaic of resources, development, ownership and use in the general area, as well as the reservoir area, is the cumulative effect of natural and human events and actions to date. Both natural and human events and actions will continue to affect this mosaic in the future. A given action or event can cause effects that are both adverse and beneficial, depending on the specific resource or use involved. For example, wildland fire may reduce the presence of a certain plant species, but increase the presence of others. Likewise, human use and development may adversely affect various components of the environment, but they also help meet the needs and desires of people, including economic value, physical goods, and leisure-time activities.

This analysis of cumulative impacts is very general in nature and only addresses environmental elements within close proximity to the reservoir area, since that is where most of the cumulative effects will occur. Within the general area of the reservoir, management decisions and uses that may affect resources both within and/or outside of the reservoir area are made by many different public and private entities and the location, timing, and magnitude of these actions are not always known. Also, the additional effects from implementation of the proposed Navajo Reservoir RMP would be minimal compared to the cumulative impacts from all actions within the general area.

The following cumulative effects apply to both the No Action and the Proposed Action alternatives. The no action alternative would have cumulative effects similar to what is now occurring. Cumulative adverse effects are currently occurring under the Existing Condition and similar effects will continue to occur under both of the RMP's alternatives. However, the overall cumulative effects from the proposed action are generally expected to be less than those from the No Action, due to the increased proactive management of the resource area..

### Cumulative Adverse Effects

Cumulative adverse effects within and adjacent to the reservoir area include the following:

- Increased disturbance of vegetative communities and fragmentation and deterioration of the associated wildlife habitats due to increased development and human use of the area.
- Increased degradation of regional air quality as a result of increased population and development with the associated increase in energy production and use.
- Increased degradation of surface water quality due to both point and non-point pollution sources and the increasingly limited ability of the river system to accommodate such pollution, especially during periods of drought or other periods of low flow.
- Reduced availability of water for all desired uses due to limited initial quantities, quality degradation, increased human population and development with the associated water needs, drought, and desired minimum flows for environmental purposes.
- Increased direct and indirect damage to cultural resources due to increased human activities in the area. Within the reservoir area these activities are generally associated with reservoir operations, oil/gas development, and recreational development and use.

### Cumulative Beneficial Effects

Cumulative beneficial effects within and adjacent to the reservoir area include the following:

- Increased reduction of adverse impacts to lands, water and the associated resources through implementation of environmental protection requirements by the authorizing officers.
- Long-term economic functioning through diversification that includes energy development and recreation/tourism as major components.
- Increased potential for the recovery of the Colorado pikeminnow and the razorback sucker through implementation of the San Juan and Colorado River basin recovery plans.

- A slight to moderate decrease in cumulative damage to historic properties and cultural items in the area due to the more proactive management of resources (including cultural resources), and human use and development within the reservoir.